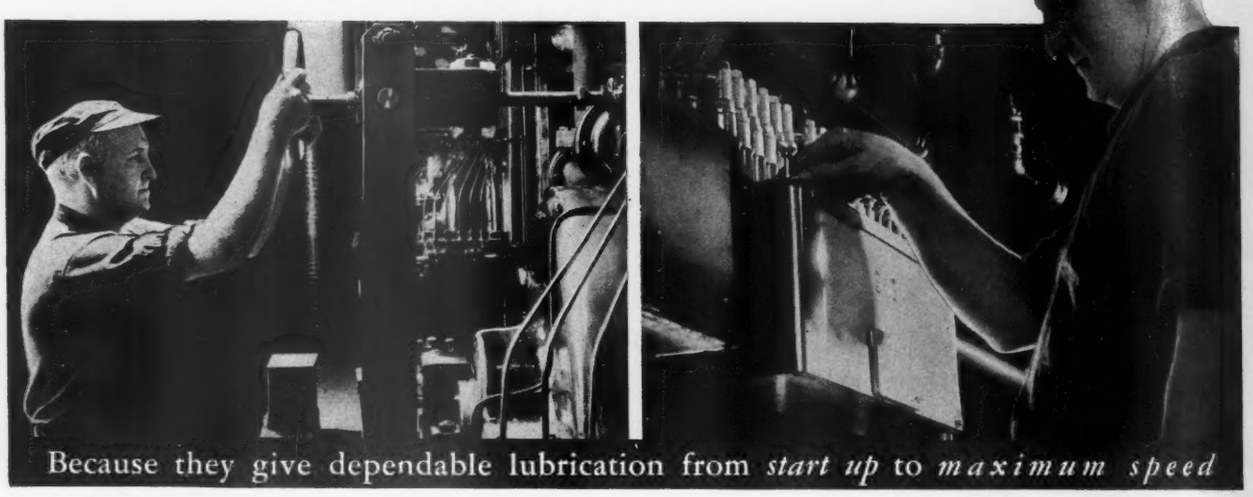
Free Rings wed Diesel operators *to these oils*



Because they give dependable lubrication from *start up* to *maximum speed*

Freer Rings and Lower Fuel Consumption

From early experimental units to the largest Diesels in America, Texaco *tested* Lubricants have helped Diesel engine operators hang up performance records.

That is because Texaco Ursa Oils and Texaco Algol Oils are refined especially for Diesels. They have consistently less carbon-depositing elements than other oils. They give exceptional freedom from stuck rings. This helps substantially to reduce fuel consumption.

Texaco Keeps Ahead of Diesel Development

In the steadily widening Diesel field, Texaco is earning a new fame for lubricants that are dependable — service that is skillful.

Today, operators of stationary units in public service and private enterprise, of transport units, of tractors, of trucks, of buses, agree that Texaco *tested* Lubricants give more lubrication at less cost.

Operating Records Prove Efficiency

Texaco "keeps cases" on the Diesels it lubricates. Every Texaco representative can show you results such as "no overhaul in two years," "exceptionally small bearing wear," "crank pins removed and replaced without shims." And these results are measurable in dollars and cents. They demonstrate what can be done for you, too.

Quality—Experience—Ability—Proof

The quality of Texaco *tested* Lubricants plus the experience of Texaco's technical staff will help you lower fuel and operating costs. Proof of our ability to help you can be demonstrated in a simple way. Just write and ask for a representative to call.

THE TEXAS COMPANY
135 East 42nd Street New York City

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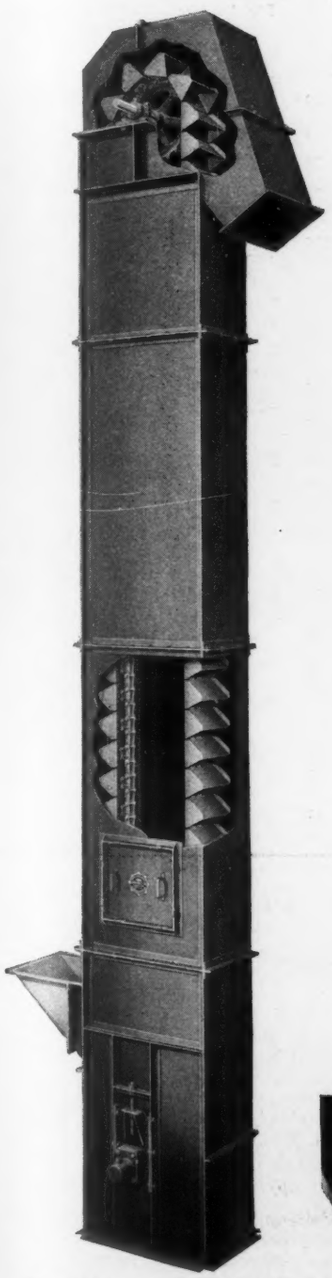
TEXACO *tested* LUBRICANTS

REFINERY TESTED FOR UNIFORMITY • • • SERVICE TESTED FOR ECONOMY

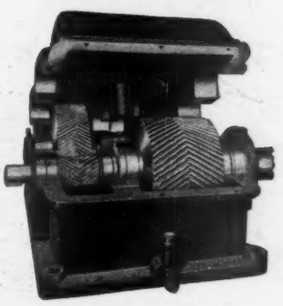
LINK-BELT

CONVEYORS, ELEVATORS, DRIVES at National Portland Cement Co.



The Link-Belt bucket elevator line is complete and includes practically every type of steel, malleable, and Promal chains, and buckets, as well as steel casings of all types.

Link-Belt makes a complete line of positive driving equipment including motorized helical gear, herringbone gear, and worm gear speed reducing units as well as silent and roller chain drives. Send for catalogs.



AT the new plant of the National Portland Cement Company, Broadhead, Pa., Link-Belt material handling equipment contributes to the efficiency of this modern plant.

Link-Belt bucket elevators, for handling clinker and gypsum and Link-Belt screw conveyors for handling cement, as well as Link-Belt speed reducers and other units, are used throughout this plant.

Link-Belt equipment is synonymous with dependable and economical performance. It is built to last, and work efficiently under the grueling conditions of cement manufacture. Send for Catalogs.

LINK-BELT PRODUCTS INCLUDE: *In addition to complete equipment for the handling, washing and preparation of sand, gravel, stone, etc., Link-Belt also makes chains of all types (malleable, Promal, steel); sprocket wheels, gears, buckets, bearings, hangers, takeups, speed reducers, silent chain drives, roller chain drives, conveyors and elevators of all types, crawler and locomotive cranes, portable loaders, etc.*

LINK-BELT COMPANY

The Leading Manufacturer of Equipment for Handling Materials and Transmitting Power

CHICAGO PHILADELPHIA INDIANAPOLIS ATLANTA
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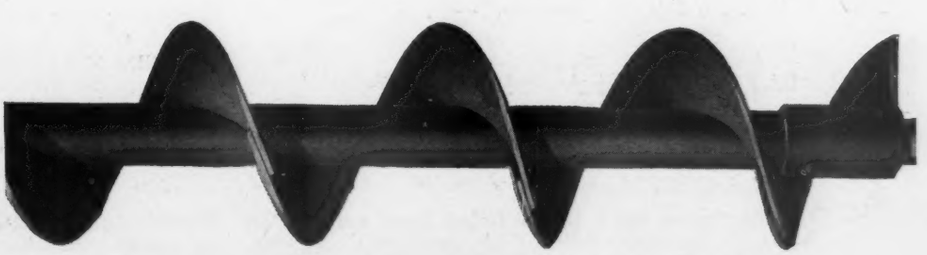

Caldwell Helicoid and sectional-flight conveyor is the standard of the industry. We manufacture a complete line of conveyors as well as troughs, fittings, hangers, linings, couplings, box ends, etc. Send for new engineering data book No. 1289. It is the most complete treatise ever published on the subject of screw conveyors.

5293-A

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Entered as second-class matter, Jan. 15, 1935, at the Chicago, Ill., postoffice under the Act of March 3, 1879.

(Published Monthly—Except January, Semi-Monthly)

August, 1935

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* *Actual monthly costs in a large middle-western plant.*

...and the Gulf Engineer Can Help You Do It!

HERE'S one big advantage in using Gulf lubrication in your plant: *It is the Gulf engineer's job* to assist you in reducing equipment maintenance expenses besides the mere cost of the lubricants.

And he is trained to do it. Every Gulf field engineer is a thoroughly experienced man—a lubrication specialist. He has worked with machinery similar to yours in many plants and you benefit from the sum total of his knowledge. A large well-trained staff of such men are in the employ of the Gulf Refining Company. If you are not using Gulf products, why not let a Gulf engineer advise you if the lubrication practice in your plant is susceptible of improvement?

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Title.....
Company.....
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Let's Look at Cordeau - -

for Jackhammer Holes

CORDEAU PAYS IN 5 WAYS

1. Simplified loading
2. Less Hazard
3. More work from your explosives
4. Better fragmentation
5. Fewer but bigger shots

(Equipment moved less often)

Write for the Cordeau Book.

WHERE the formation will permit a number of Jackhammer holes . . . Where the location will permit a single large shot in place of a lot of small ones . . .

There is where you may find it profitable to use Cordeau-Bickford, the *insensitive* Detonating Fuse.

Cordeau acts as the detonating agent in each load, and connects all holes in one pattern that "goes" as a single blast. It carries a powerful detonating wave at a speed of approximately three miles per second, resulting in the practically instantaneous explosion of all loads on the line. A cap is attached at one end of the Cordeau pattern just before shooting, and is fired with fuse or battery.

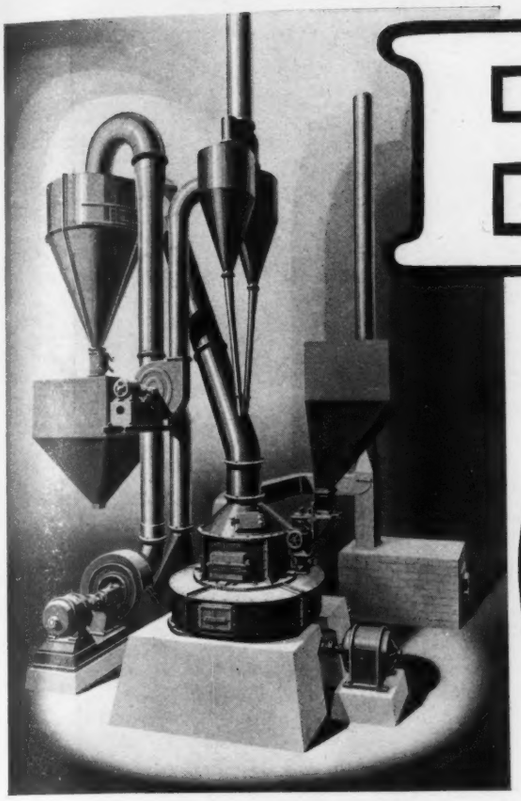
Consider each of the five savings afforded by Cordeau—and add CONTROL . . . blasting *planned* for easy removal, *timed* to the fraction of a second.

Let's look at Cordeau for Jackhammer holes—and remember, it is a natural for well-drill, wagon drill, pocket and tunnel blasting, demolition, irrigation and submarine work.
THE ENSIGN-BICKFORD COMPANY, SIMSBURY, CONNECTICUT.

CORDEAU
DETONATING FUSE
BICKFORD
ALSO SAFETY FUSE *Since* 1836

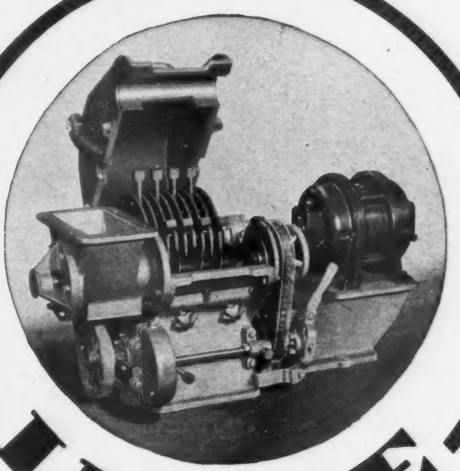
CB-45

THE ENSIGN-BICKFORD COMPANY



Big

Raymond SUPER ROLLER MILL for huge tonnages. Shown at left.



LITTLE

Raymond No. 0 SCREEN MILL

and IN BETWEEN

THE Raymond Line of Mills is so complete that you can select the exact type of equipment to fit your plant and insure economical production.

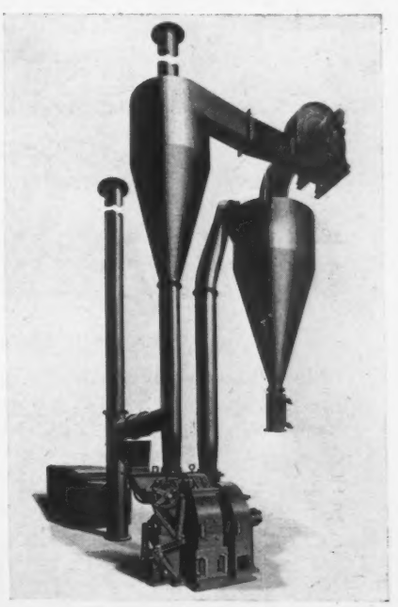
For grinding limestone, gypsum, phosphate rock, coal or other non-metallic minerals in large quantities—from 10 to 40 tons per hour—you can get these "carload capacities" in a Raymond Super Roller Mill.

For medium outputs of a few tons per hour, you can use one of the various sizes of standard Raymond Roller Mills, hammer-type Imp Mills or Automatic Pulverizers, suitable for soft or semi-hard materials.

If your requirements call for a few hundred pounds to several tons per hour of soft materials, you have a choice of three sizes of Raymond Screen Pulverizers. For larger capacities and harder materials, Midget Roller Mills will do the job.

In fineness, you have a wide range from coarse, granular materials to the finest micron material, testing 99.9% through 400-mesh. For simultaneous drying and grinding, you can use Raymond Kiln Mills.

Refer your pulverizing problem to Raymond engineers—48 years of experience at your service.



Raymond Hammer-type KILN MILL.

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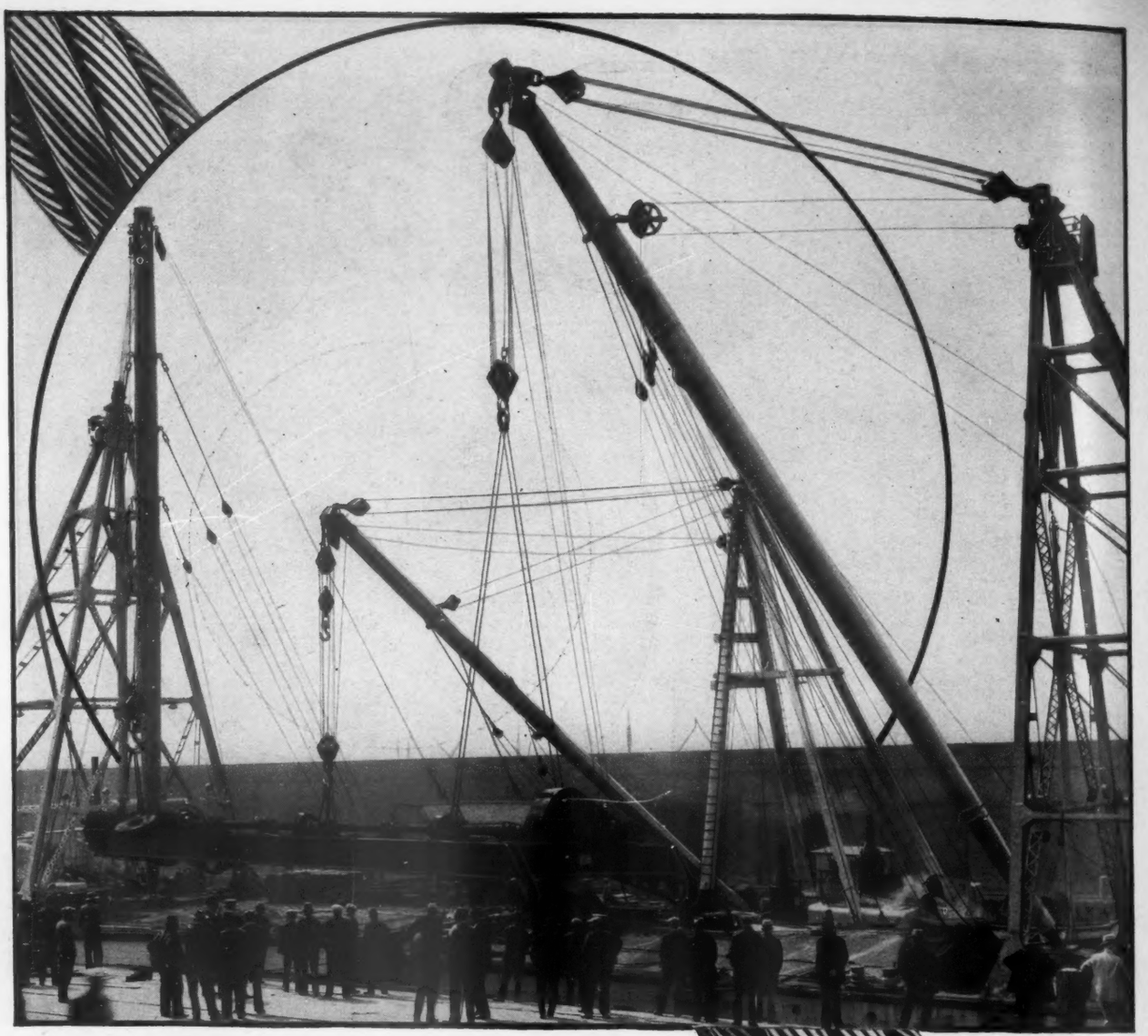

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IS ONLY IN ACTUAL SERVICE

It is one thing to talk about the ability of Wire Rope to "take it"—and it is quite another thing to prove exceptional ability by actual performance on the job. In every field of application—wherever the hardest of tasks are to be accomplished—the chances are you will find American Steel & Wire Company Wire Rope doing the work—doing it better—and more economically. This widespread preference is based on proved service records—and on the knowledge that no problem is so large or so small that our engineers will not welcome an opportunity to cooperate.

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for hauling · dumping · spreading

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Our records reveal an astounding lack of replacement part orders for Koehring Dumptors—so emphatically few, to be almost unbelievable.

Write us for information about the "almost negligible" maintenance cost of Koehring Wheel Dumptors.

20 MILES per HOUR

Special axle design for tough hauling work — 4" chrome nickel axles in one piece alloy steel housing — large tapered bearings — *no failure here.*

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Pavers · Mixers · Shovels · Cranes · Draglines · Dumptors · Mud-Jacks

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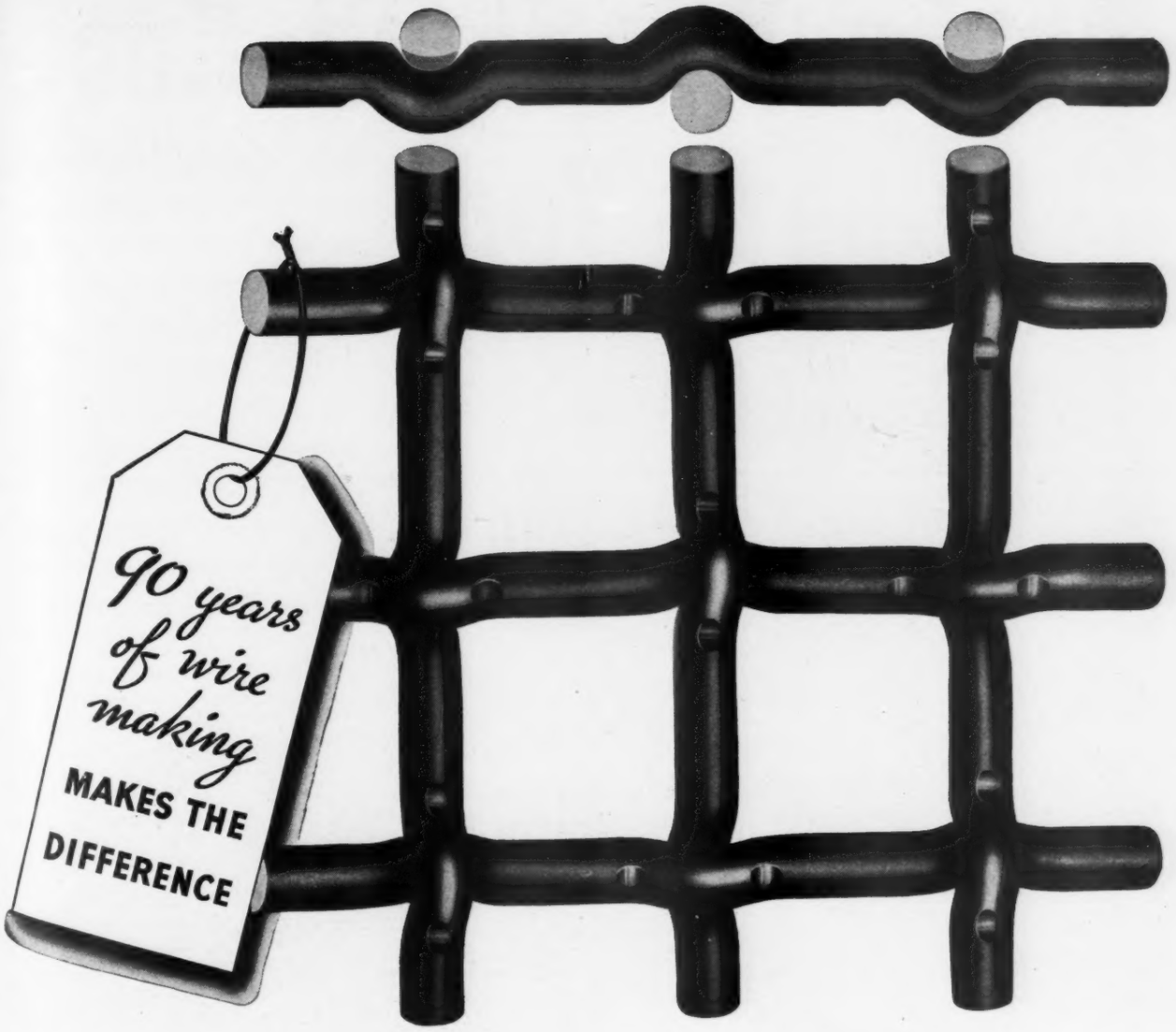

THAT'S THE STORY IN A *Nutshell*

OVER 90 years of experience in producing wire to meet a wide variety of severe requirements... made available by Roebling to help you solve your wire screen problems.

Many plants have lowered their screening costs by taking advantage of this experience. Why not let us put it to work for you?

Roebling Wire Screens are available in many types and metals to meet a wide range of efficiency, vibration, and abrasion requirements.

We would welcome your request for our cooperation, further information, or a copy of our new Wire Screen Catalog.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N.J. *Branches in Principal Cities*

ROEBLING *Wire Screen*

TRADE JERSEY MARK

ROEBLING — MAKERS OF WOVEN WIRE FABRICS FOR OVER HALF A CENTURY

Maybe You Don't Know Costs You!

Many plants don't. They look at price. They should look at cost per ton. On that basis, Goodrich welcomes comparison with any other belt in the world.

To make it easy for you to prove, in your own operation, how much longer Goodrich Conveyor Belt lasts, we will supply each user with a free record form for every con-

Coke is particularly hard on most conveyor belts, but Goodrich Belt is built to withstand cutting action as well as abrasion.

Goodrich Belt helping to speed an enormous construction project in the Middle West.

GOODRICH MECHANICAL RUBBER GOODS FOR THE ROCK PRODUCTS INDUSTRY INCLUDE:

- Conveyor, Elevator and Transmission Belting
- Multiple-V Belts
- Air, Water, Fire, Steam, Suction and Cement Discharge Hose
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- A Complete Line of Miscellaneous Rubber Items

Goodrich

What CONVEYOR BELT

veyor he has. Then let the belts themselves tell their own story in actual service.

WHY GOODRICH BELTS LAST LONGER

Modern Goodrich Conveyor Belts represent seven important improvements in product and processing control. One of the most vital of these is the improvement in rubber compounding. Goodrich has developed entirely new rubber compounds, never before available to anyone for any product—compounds which virtually make rubber a new material with entirely new ability to resist abrasion, heat, rough handling, flexing, the usually-expected deterioration in use.

This improved Goodrich belt is setting new records in low handling cost per ton, low maintenance, freedom from costly shut-downs. We are so certain it will do the same for you that we welcome exact comparison. Next time you order belting, specify Goodrich and our free cost-finding record system. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

Goodrich ore-handling Elevator Belt subject to severe abrasion.

Goodrich Belt on a Conveyor Boom, in levee work on the Mississippi.

Every batch of rubber compounded for Goodrich Conveyor Belts must pass four rigid tests.

ALL *products problems* IN RUBBER

Conveyor Belting

THE SHOULDER TAKES THE SHOCK

IN TIMKEN ROCK BITS

a feature that increases drilling speed

A more uniform distribution of the blows is obtained by means of the shoulder on the steels used with Timken Bits. This has been proved to increase the drilling speed considerably in any kind of rock.

Furthermore, with the solid, upset shoulder taking the shock, all impact stresses and strains are removed from the threads of both the bit and steel, thus protecting the threads against excessive wear and damage.

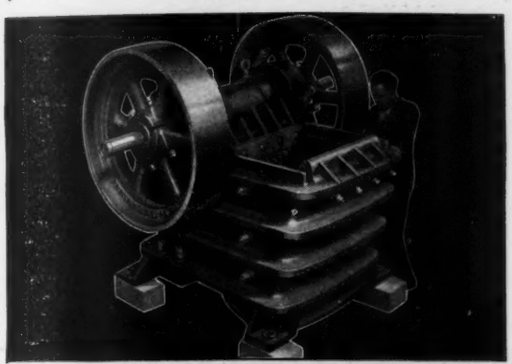
The shoulder principle is an exclusive feature of Timken Bits . . . one of several advantages that will enable you to save time and cut rock drilling costs to the bone. Write for full information.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN BITS

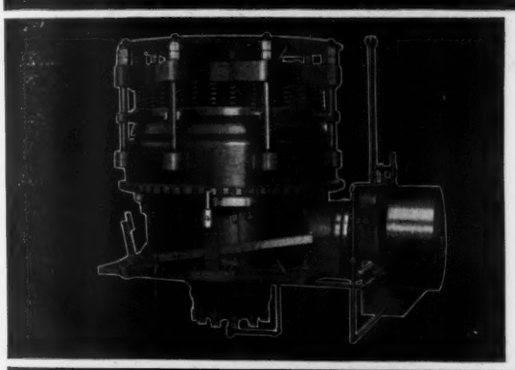
3 WAYS TO BETTER THE PRODUCT AND CUT OPERATING COSTS

Modern in every sense of the word . . . . designed to enable you to meet today's conditions and operate at a profit . . . . this 3-piece combination of Telsmith equipment is a striking example of group efficiency.



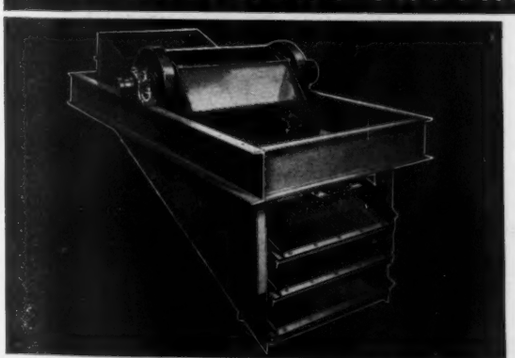
● With its compact but massive steel structure, cylindrical roller bearings and high speed crushing action, the Telsmith-Wheeling Jaw Crusher is ideal for coarse crushing. The roller bearings and higher speed almost double the capacity without any greater expenditure for power. Simple adjustment allows wide sizing range. Up-keep is reduced to a minimum. Write for Bulletin W-11.

WHEELING JAW CRUSHER—FOR COARSE CRUSHING



● The Telsmith Gyrasphere takes the trouble out of secondary crushing. Working at choke feed, it turns out a bigger tonnage and more cubical product—crushes finer, with low power consumption and up-keep. The reasons—spring relief, rotary head support, spherical head, unit spring design, anti-friction thrust bearings, pressure lubrication, different distribution of crusher pressures. Write for Bulletin Y-11.

GYRASPHERE CRUSHER—FOR FINER CRUSHING



● The Telsmith Pulsator screens crushed rock, sand, gravel, ore or coal . . . wet or dry. Its circular movement produces a maximum screening action, uniform on every inch of the wire, on every deck, under any load. The toughest alloy steels, the finest anti-friction bearings and special labyrinth and piston ring steels (to protect working parts) give longer life and lower up-keep. Write for Bulletin V-11.

M-1

PULSATOR—FOR EFFICIENT SCREENING

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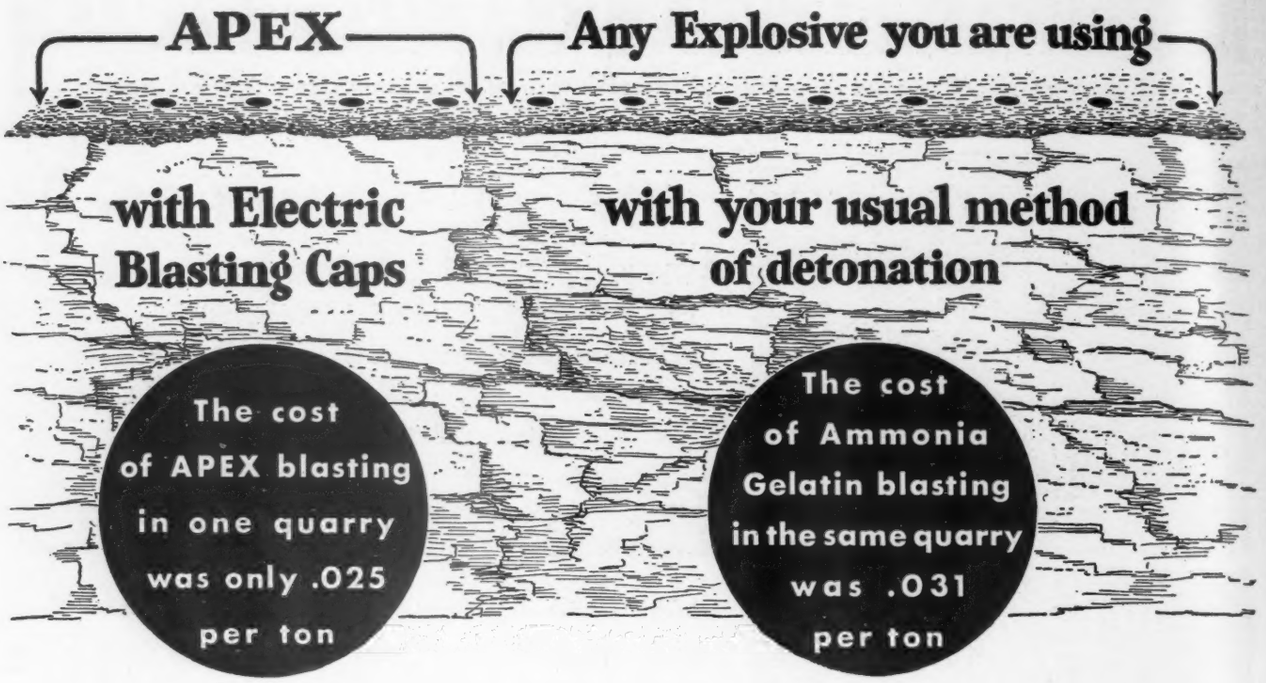
TELSMITH

Just Try *This:*

Try five holes with Apex on your next blast



Prove to yourself how much Apex saves you

For many a quarryman Apex has cut costs in production—in drilling—in shovel maintenance. Its balanced power offers new economies. Its *new action* stresses burdens and causes favorable breakage and fragmentation.

Apex may not be adaptable for *every* quarry but favorable reports of its action are being received from an increasingly large number of operations.

Apex may show equal or even greater savings in your quarry. A test will tell the story.

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Cable Address—Atpowco

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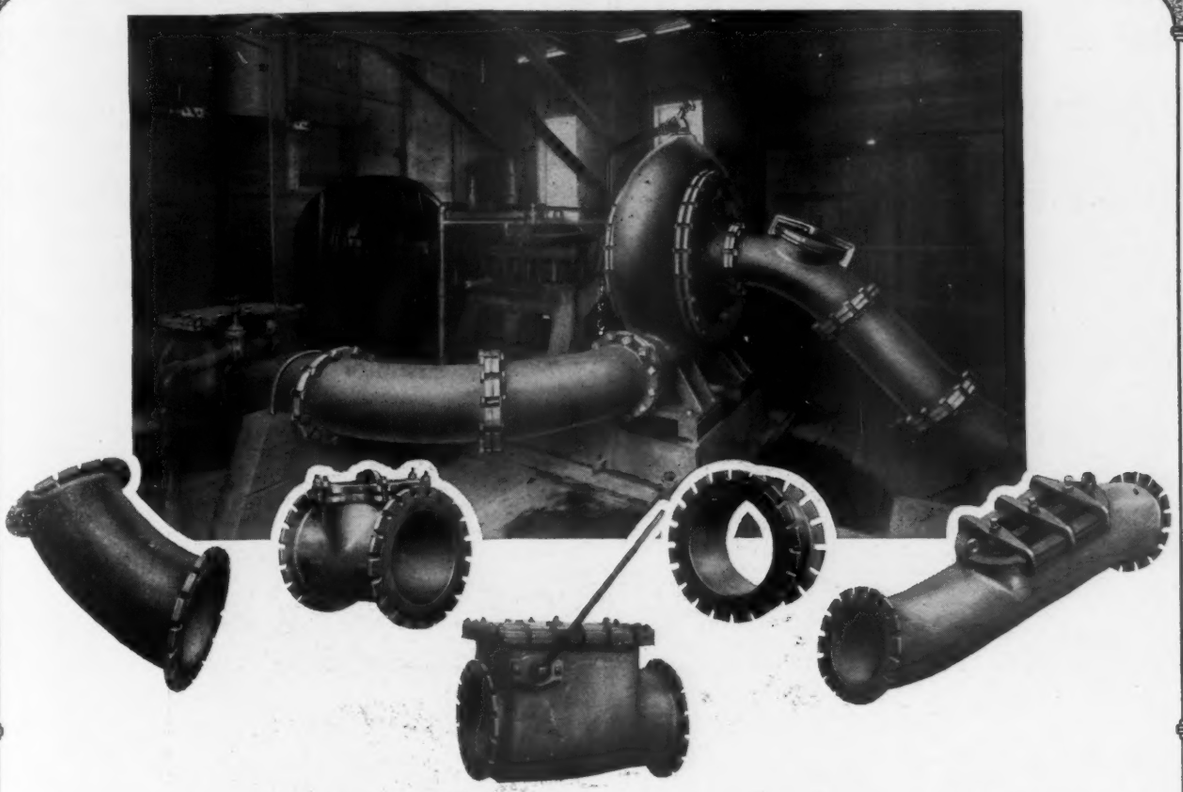
EXPLOSIVES

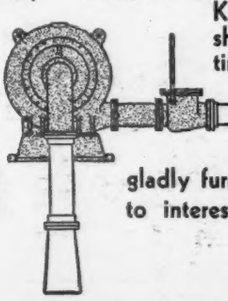


HYDRAULIC DREDGE PIPE LINE FITTINGS

AMSCO Dredge Pipe Line Fittings fully meet the needs of the Hydraulic Dredging Industry for strong and long-service fittings in pump and pipe line hook-ups. They have been used successfully for years under the most severe pipe line velocity and pressure conditions. Their use contributes to the highest overall efficiency of hydraulic dredges at minimum cost of repair parts and repair labor, and assures the greatest number of productive operating hours. They embody: Safety, Dependability, and Economy.

We make a complete line of AMSCO Fittings, incorporating Elbows, Pipe, Offset Pipes, Nipples, Reducers, Flap Valves, Expansion Joints, Pipe Flanges and Hose Nipples, in standard designs, and have patterns available for almost all types of parts, in the range of popular sizes from 3-inch to 18-inch, inclusive. For sizes of fittings larger than 18-inch, we have numerous designs and patterns, but since these larger sizes of fittings are generally built to meet some particular dredge specifications, we consider them special. We are prepared to design and build any size and type of Special Dredge Fittings, within conservative length dimension, to suit individual installation requirements.

AMSCO Dredge Pipe Line Fittings are made of analytically controlled, scientifically heat treated AMSCO manganese steel, the "Toughest Steel Known", which, being unequalled for its shock and wear resistance, assures long time, trouble-free operation.



We invite your inquiry for application details on AMSCO Dredge Pipe Line Fittings. We will gladly furnish descriptive information and prices to interested parties. Write for details today!

AMERICAN MANGANESE STEEL COMPANY

Division of American Brake Shoe & Foundry Company

377 East 14th Street

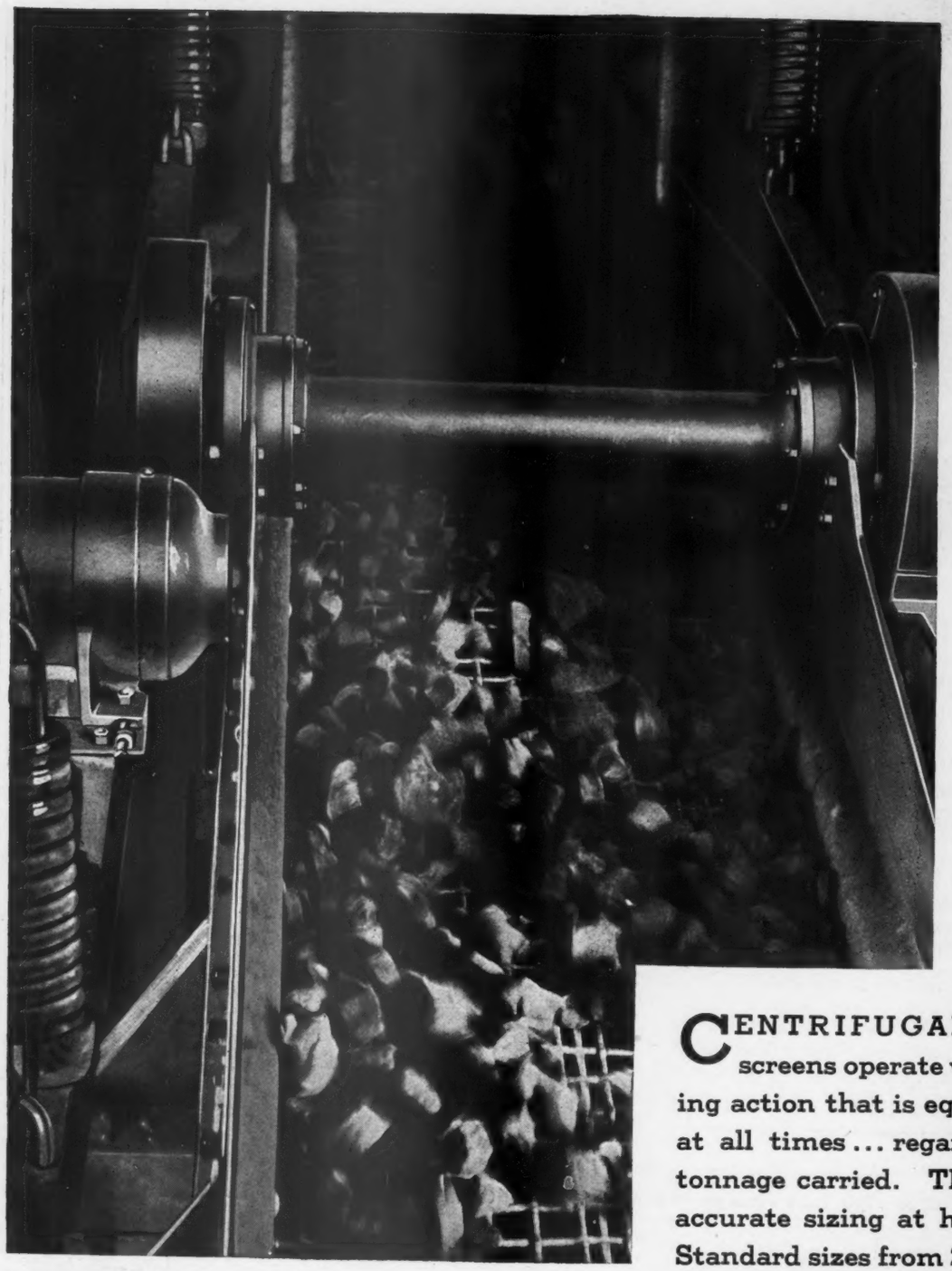
Foundries at Chicago Heights, Ill.; New Castle, Del.; Denver, Colo.; Oakland, Calif.; Los Angeles, Calif. • Offices in Principal Cities

Chicago Heights, Illinois

AMSCO

TRADE MARK REGISTERED

UNIFORM ACTION



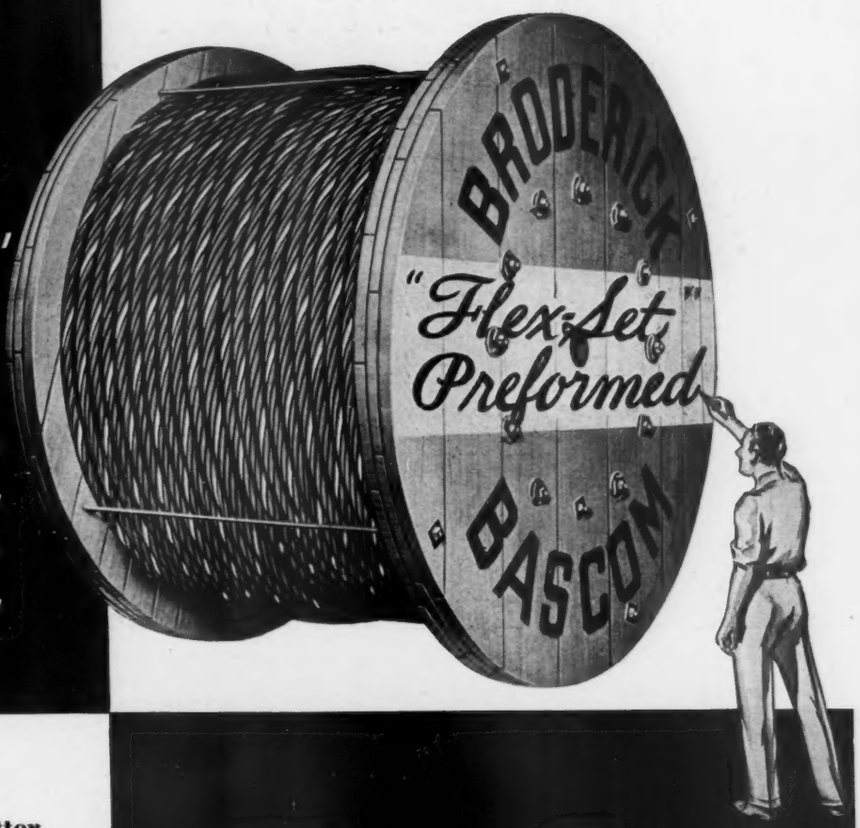
4′x14′ Triple Deck
Centrifugal Vibrating
Screen

CENTRIFUGAL vibrating screens operate with a screening action that is equally intense at all times ... regardless of the tonnage carried. This results in accurate sizing at heavier loads. Standard sizes from 2′x6′ to 5′x14′, single, double and triple deck. Write for Bulletin 1474.

ALLIS-CHALMERS

— Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, U.S.A. —

The "LAST WORD" IN WIRE ROPE



WE couldn't find better wire than we have been using in Yellow Strand Rope, which is drawn to our own specifications after more than half a century of rope making experience.

We couldn't build it into a better balanced, more uniform rope.

But we could — and did — adopt the preforming process which does away with internal stress and its resulting evils.

Result: "Flex-Set" Preformed Yellow Strand Rope—tough, elastic, strong by nature. Improved by preforming to resist kinking and fatiguing, to spool true and reeve easily, to run smoothly in grooves, to make splicing easier, to work better, last longer and save money on any material-handling job. Try it.

R-3

"Flex-Set" Preformed YELLOW STRAND

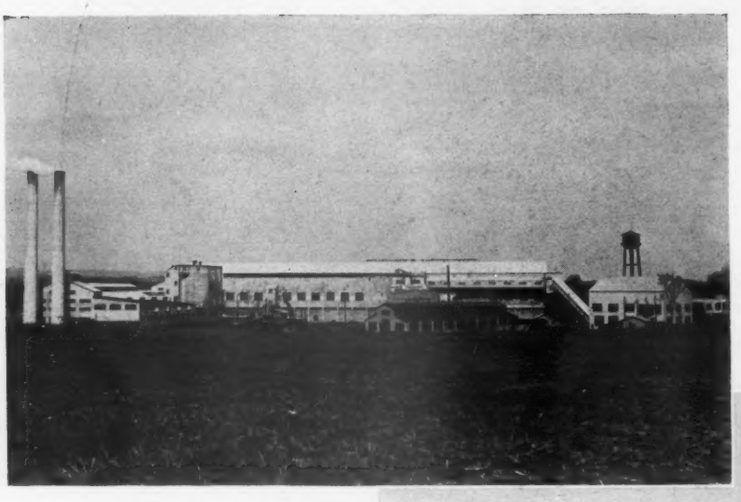
Broderick & Bascom Rope Co.

St. Louis, Mo.

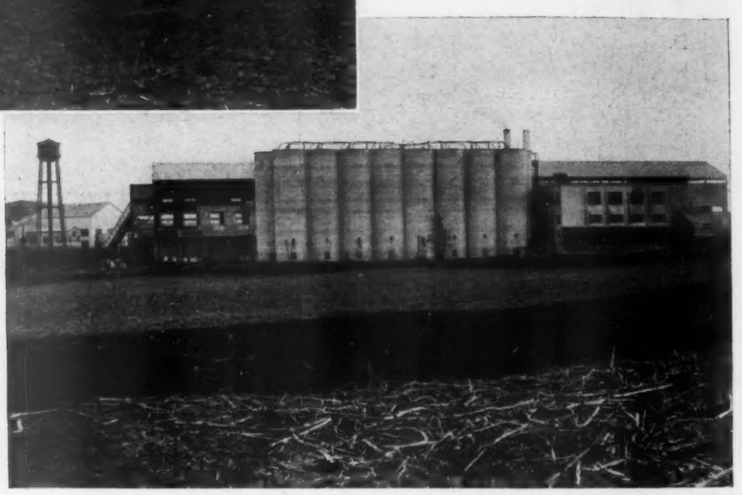
Seattle New York Portland Houston

Factories: St. Louis and Seattle

National Portland Cement Plant Added to "LONG" List!



General view of the new National Portland Cement Plant at Brodhead, Pa., recently completed by the M. A. Long Company.



Showing view of the silos of the National Portland Cement Plant at Brodhead, Pa.

The new National Portland Cement Plant at Brodhead, Pa., is another example of the long list of achievements of The M. A. Long Co. in designing and constructing modern plants to meet the specialized needs of American Industry.

Whether a building project is large or small, The M. A. Long Co. plans and schedules each operation and dovetails them nicely, so as to assure economical erection costs and efficiency when in use. For the last decade this organization has been setting standards of building and the maintenance of building schedules generally recognized as unparalleled in the annals of concrete construction.

In the erecting of the new National Portland Cement Plant, The M. A. Long Co. organization prepared all drawings of the Buildings and constructed the specially designed Stockhouse, Packhouse, Slurry Tanks, Slurry Basin, Kiln Building, and Wash Mill, and completed the building program on schedule.

Long engineers were always alert to co-operate with the management of the National Portland Cement Company to make this new plant the last word of efficiency in the cement industry.

Write us for full information regarding Long Building service which includes the design and construction of Cement Plants, Grain Elevators, Industrial Buildings of every description, as well as Schools, Apartment Houses, Churches, Etc.

The M. A. LONG *Co.*

Engineers and Constructors

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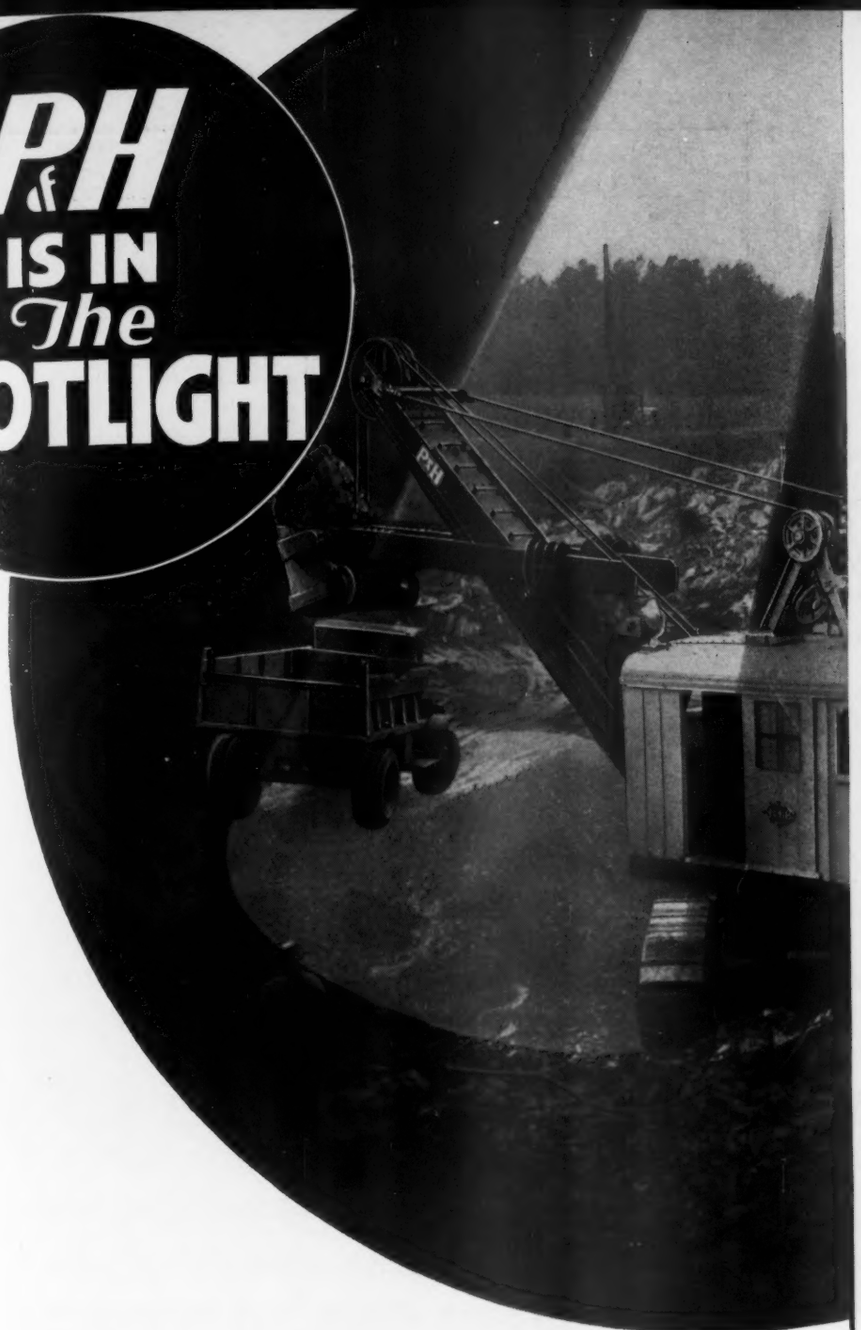
ALLENTOWN CHICAGO

P&H IS IN The SPOTLIGHT



AS AMERICA'S MODERN CEMENT MILL Gets Under Way

There's the last word in cement-making methods at the new plant of the National Portland Cement Company at Brodhead, Pennsylvania. And with this P&H 1200 WL, there's the last word in equipment, too. . . . Even before buildings were completed, this machine was on the job . . . toting steel beams . . . lifting 37-ton parts for crusher assembly . . . grading for ramps . . . gearing up for quarry operations in general. . . . That sample of P&H performance was enough. Fast, continuous production is the demand on excavators to keep pace with America's most modern cement plant. That's why a second P&H 1200 WL went to Brodhead.

Equipment Selected for High Production

Representing an investment of $2,500,000, the facilities of the new plant of the National Portland Cement Company at Brodhead, Pa., provide capacity of one and a quarter million barrels per year. All equipment has been selected to meet the demands of sustained high production.

Faster Operating Speeds For Excavators

To maintain a continuous supply of rock for the crushers, P&H Ward Leonard machines were selected. Faster operating speed is accomplished through high over all horsepower and a more advantageous distribution of weight. The carefully grouped machinery units behind the center of rotation act as a natural counterweight and do away with much of the dead-weight which would otherwise be required. It means a consequent increase in operating speeds with maximum power efficiency.

Swing Increased to 3½ R. P. M.

The P&H swing units, built on the modern vertical motor, helical gear principle, speed the swing up as fast as 3½ R.P.M. On the 4 yard swing units operate in parallel, each sharing one-half of the torque required to rotate the machine. All gears and shafts are mounted on anti-friction bearings and sprayed with oil from a separate, high pressure pump.

Simplified Control by Push Buttons

In the interest of faster, simpler operation, all movements of the P&H Ward Leonards are electrically controlled, eliminating hand levers and manually operated foot pedals. This applies to steering as well, which is accomplished through the use of electrically operated hydraulic cylinders. Travel speeds up to 1½ M.P.H. are unusually high for machines of 2, 3 and 4 yards capacity. Ask for catalog WL-1.

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P&H WARD LEONARD ELECTRIC EXCAVATORS

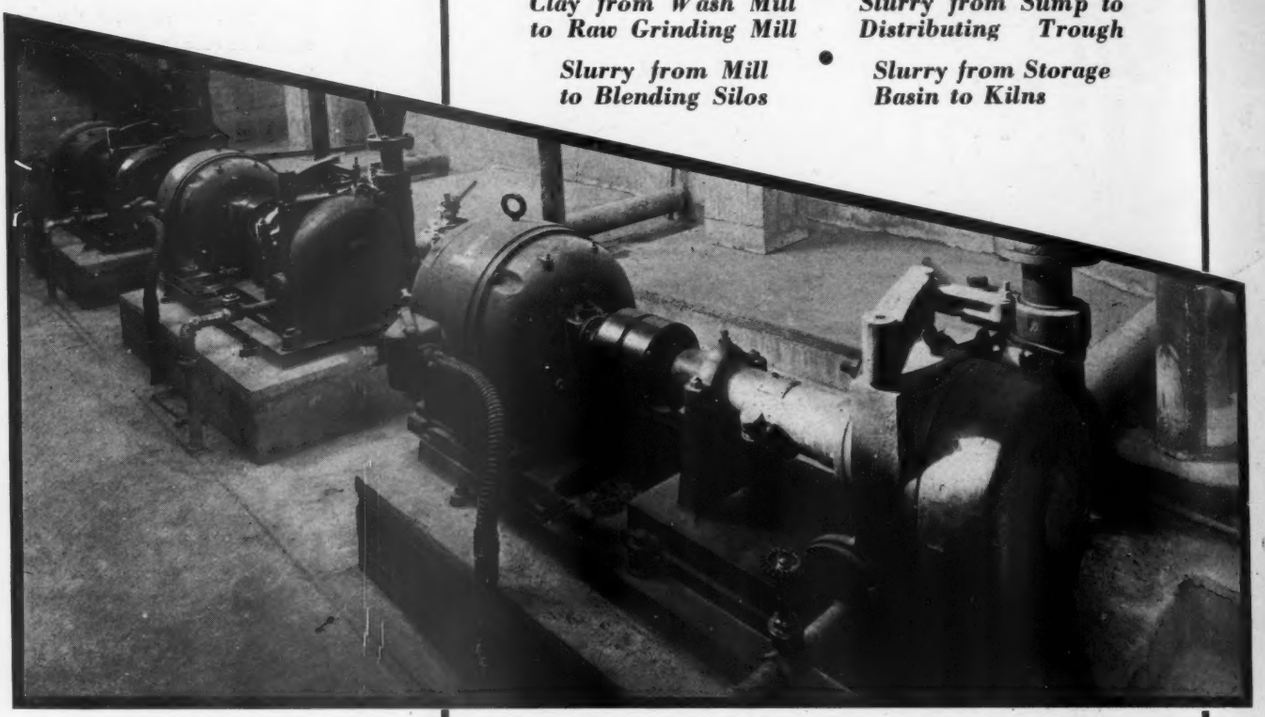
NATIONAL PORTLAND CEMENT
BRODHEAD, PA.

Clay from Wash Mill to Raw Grinding Mill

Slurry from Sump to Distributing Trough

Slurry from Mill to Blending Silos

Slurry from Storage Basin to Kilns



WILFLEYS *are Doing This Important Work*

Wilfleys have given a remarkable performance throughout the Cement Industry handling the various clay and cement slurries and naturally were selected for this entirely modern, new plant.

Wilfleys maintain high efficiencies and operate with practically no attention required as there is no rubbing contact while running.

Let us explain the many advantages that Wilfley Slurry Pumps offer.

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VULCAN

AT

NATIONAL PORTLAND CEMENT CO.

12-Ton 115-H.P. VULCAN standard gauge GASOLINE Locomotive operating at the Brodhead, Pa., plant of National Portland Cement Company.

The locomotive shown above at present only handling one loaded car weighing 17 tons gross from face of quarry to foot of incline. The ultimate load is four cars or 68 gross tons on fairly level track at a speed of 12 m.p.h., rolling friction for cars and track being based at 40 lbs. per ton.

Photograph below illustrates shop view of a Vulcan 100 h.p. double friction drum, double gear reduction hoist equipped with powerful Lane friction clutches and operated from a remote control, hoists the material on a double-track plane 300 feet long on an 18° pitch at 300 feet per minute. Hoisting is balanced, but hoist is designed to hoist an occasional unbalanced load of 34,000 lbs. Hoist is located under dump and haulage ropes are guided over 6'6" diameter Vulcan "Allcasteel" roller-bearing sheaves. On the plane Vulcan roller-bearing slope rollers are used, reducing rope friction to a minimum.

Vulcan hoists are ruggedly designed and include many exclusive features. They are built to suit any hoisting requirements and are found in all parts of the world.

OTHER VULCAN PRODUCTS FOR THE INDUSTRY

LOCOMOTIVES:	Steam, Gasoline and Diesel Geared; Gasoline and Diesel Electric; Trolley Electric; Storage Battery; and Larry Cars.
KILNS, ETC.:	Rotary Kilns, Dryers and Coolers; Vertical Lime Kilns; Hydrators; Ball and Tube Mills; Special Process Equipment.
HOISTS:	Room Hoists; Scraper Hoists; Car-Pulling Hoists; Self-Contained Hoists; Heavy-Duty Shaft and Slope Hoists.
MISCELLANEOUS:	Moulded tooth gears—Steel and Iron; Machine-cut gears—Steel and Iron; Herringbone gears—Steel and Iron; O. H. Steel Castings—Steel and Iron; Plate metal work—riveted and welded construction.

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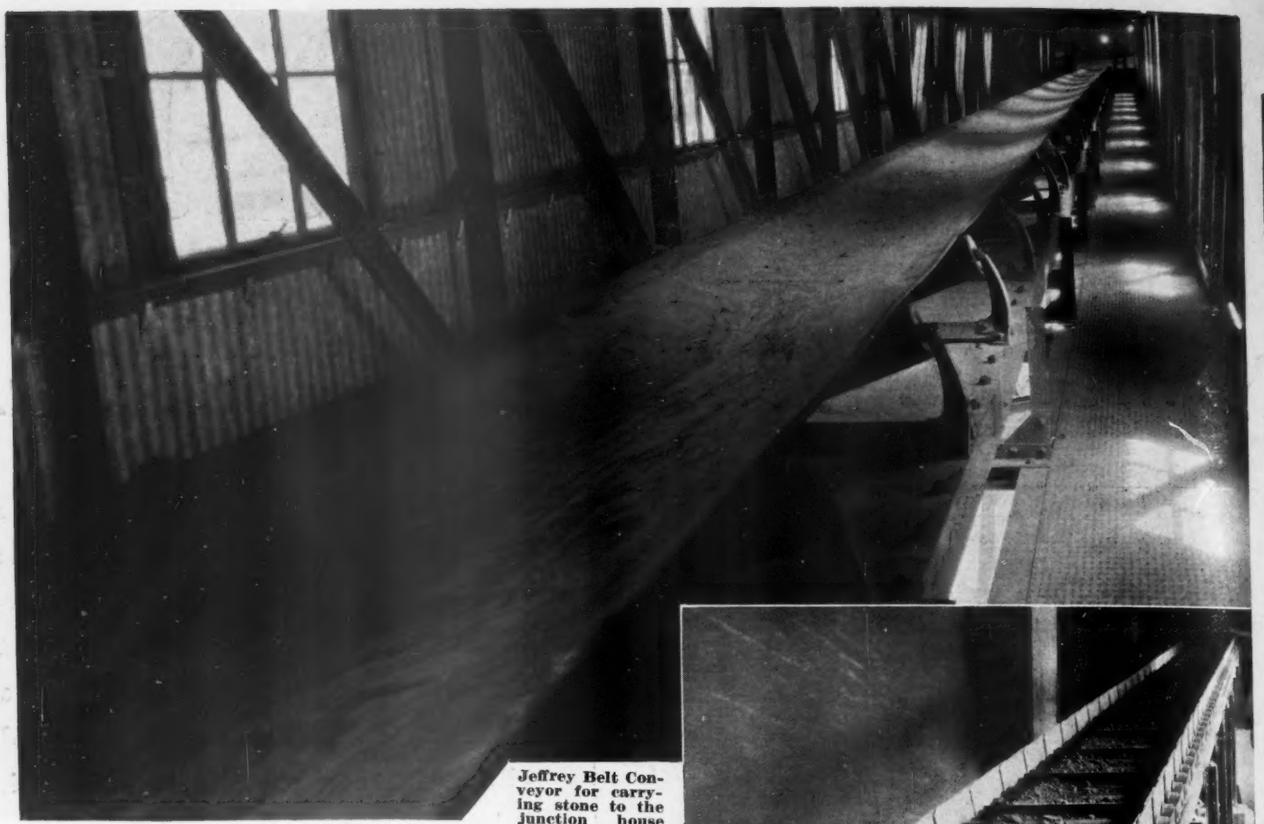
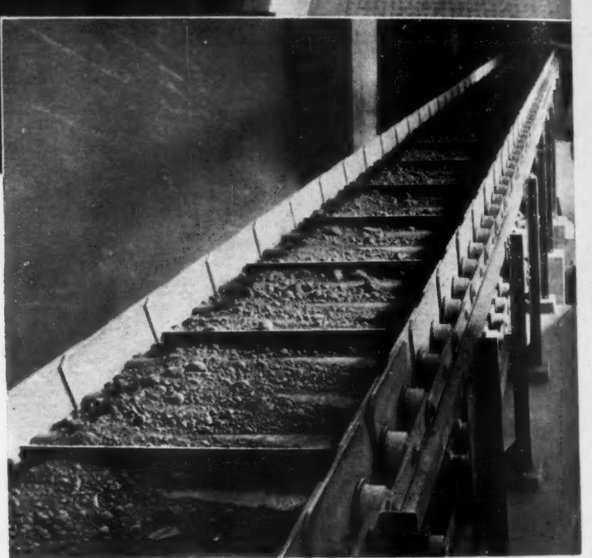


Jeffrey Belt Conveyor for carrying stone to the junction house in the main storage building.



Jeffrey Heavy Duty Steel Apron Conveyor for handling clinkers.

JEFFREY at National Portland

The new Cement Plant at Brodhead, Pa., embraces the last word in modernity . . . Jeffrey's contribution to this vast enterprise included: Belt Conveyors, Steel Apron Conveyors, Feeders, Crushers and Coal Handling Equipment . . . all designed to fit into National Portland's scheme of up-to-the-minute cement-making.

Jeffrey will demonstrate its merit on this job as it has done in thousands of large plants all over the world. Since 1877 Jeffrey Engineers have been diagnosing and prescribing for the material handling needs of practically every basic industry . . . the cement industry is no exception . . . and have solved almost every conceivable problem.

National Portland wanted equipment that could take it . . . that embodied all the latest developments . . . that could give the utmost in operating economy and unequalled service . . . they turned to Jeffrey.

Perhaps you have conditions under which Material Handling Equipment should be carrying an important part of the load. Let us find the practical solution . . . whether the job is large or small.

The Jeffrey Manufacturing Company

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Jeffrey Manufacturing Company, Ltd., of Canada
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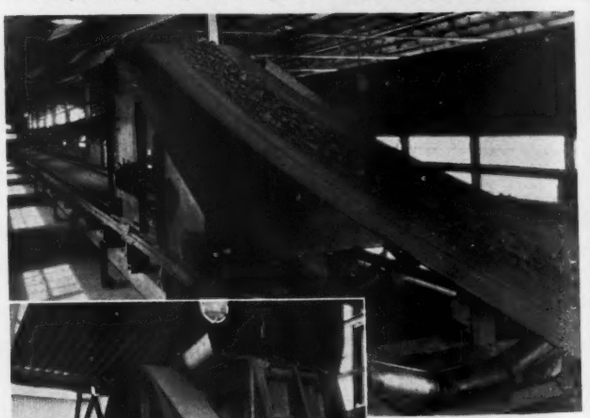
JEFFREY



Jeffrey Belt Conveyor with traveling Tripper (above) used for discharging stone into storage at any point along its length.

Jeffrey "Flextooth" Coal Crusher (left). Coal is fed from track hopper by Jeffrey Apron Feeder into this Crusher, then to Jeffrey inclined Belt Conveyor.

CEMENT PLANT MACHINERY

F. L. SMIDTH & CO. Manufacture the Following Complete Line of Modern Cement Plant Machinery

UNIDAN multi-compartment grinding machine.

UNIKOM multi-compartment grinding machine.

KOMINUTER for wet and dry grinding.

TUBEMILL for wet and dry pulverizing.

TRIX for grading wet granulated material.

TIRAX MILL for drying and grinding coal.

PYRATOR for drying and grinding coal.

SPRAY CASINGS for pulverizers.

CYLPEBS metallic grinding bodies.

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SILEX flint liners for pulverizers.

SYMETRO Drive, speed reduction units.

FLOURMETER for determining micron sizes in finely ground cement, etc.

ROTARY KILNS for cement, lime, etc.

UNAX KILNS, with integral cooler.

UNAX COOLERS, cooling drums mounted on kiln.

UNAX GRATE COOLER, air quenching type.

COOLERS, rotary pressure coolers.

CHAIN SYSTEM for heat economy in kilns.

KILN CONTROL, electrical.

MOLER insulating bricks for kilns, etc.

COAL FEEDERS for rotary kilns.

COAL BURNERS for rotary kilns.

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OIL BURNING EQUIPMENT for rotary kilns.

KILN EQUIPMENT, fans, hoods, dampers, spouts, airseals, dust chambers.

FLUXO PUMP for pneumatic transport.

FLUXO PACKER for filling bags.

AIR SEPARATORS and Cyclones.

EXBINER for discharging bulk cement.

SKIPULTER shaker conveyor.

CYLCUP distributing conveyor.

SLURRY FEEDERS for kilns and mills.

CRADLE FEEDERS for coal, rock, clinker.

TABLE FEEDERS for coal, rock, clinker.

LENIX short center belt drive.

PUMPS for heavy liquids as cement slurry.

AGITATORS for mixing and storing wet mix.

WASHMILL for disintegrating and mixing materials in water.

CEMENT PLANT ENGINEERING

F. L. Smidth & Co. are also engineer specialists in designing and equipping factories for making Portland cement, having devoted their efforts exclusively to this industry for a period of fifty years.

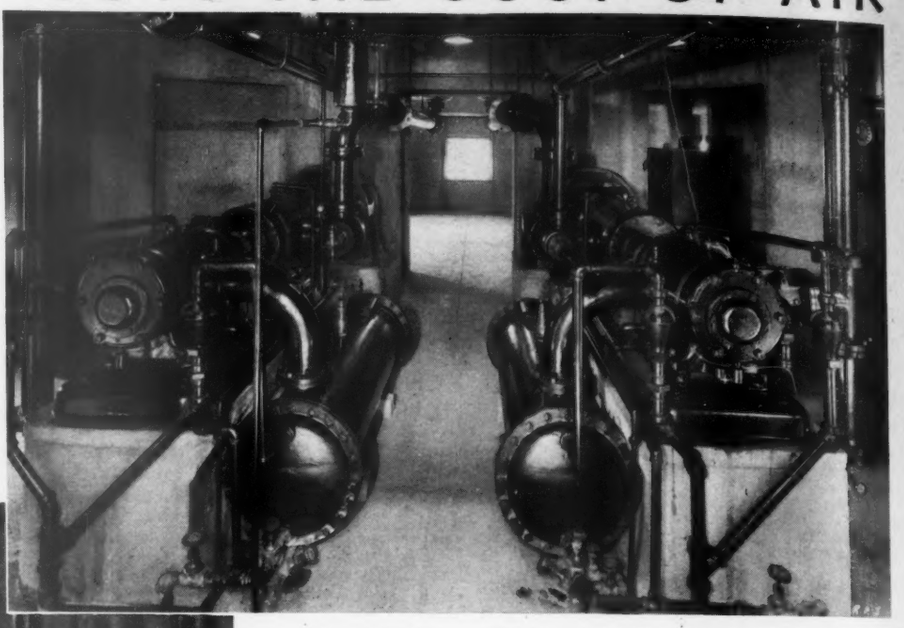
Their engineering services include all stages of the project from the preliminary investigation of the site and raw material deposits, chemical and physical tests of the raw materials and finished cement, to all necessary drawings and specifications for erecting and equipping all departments of the plant, including also the electrical engineering.

This service applies equally well to complete new plants or any special department of a plant—to revisions or conversions of existing plants—making standard Portland cement, slag cements, white cement, or for making special high early strength cements, such as "VELO."

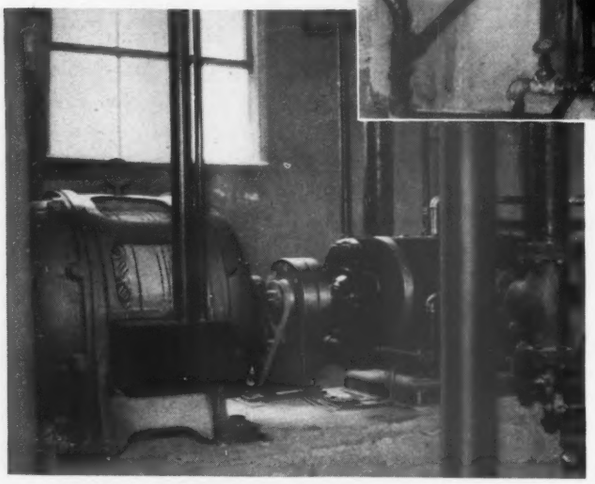
F. L. SMIDTH & CO.

225 BROADWAY NEW YORK, N. Y.

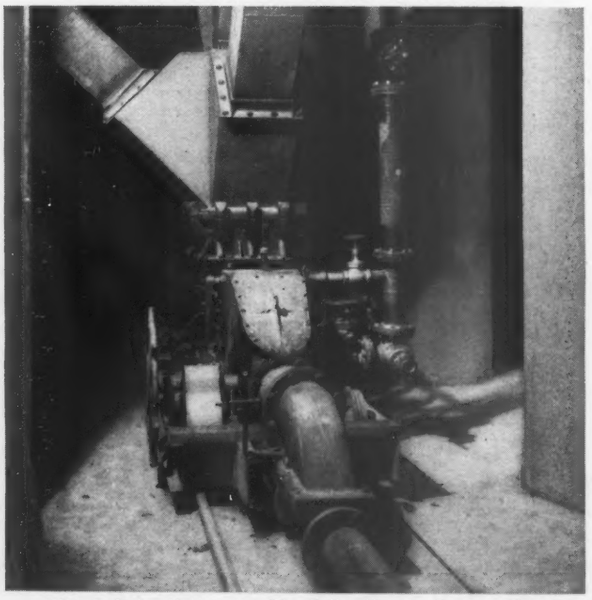
NATIONAL PORTLAND CUTS THE COST OF AIR



One of these two-stage compressors serves a pneumatic conveyor. The other furnishes air for slurry agitation. Each has an actual delivery of 800 CFM and is compressing to 75 pounds. A small two-stage machine at the quarry supplies air to 100 pounds.



One of the three single-stage compressors which supply the Fuller-Kinyon Cement Pumps and the pack-house. Actual free air delivery 530 CFM when compressing to 40 pounds



One of the three portable Fuller-Kinyon Pumps which transport cement from the storage silos to the pack-house.

PROPER SELECTION OF UNITS FOR EACH DUTY

There are six separate Fuller Rotary Compressor installations. Each is designed to satisfy separate demands for volumes and pressures. There is no excessive idling time—no necessity to operate a large machine at poor power efficiencies, to meet a small demand when some of the consuming units are idle—no high main supply pressure reductions for low pressure uses, with the losses of the disproportionate power consumption required for high pressures. Line losses are negligible, for there are no long transmission lines.

Fuller Rotary Compressors are particularly well adapted to meet every requirement for such unit installations. Large capacities with relation to size permit installation where space is too limited for other types. Operation is vibrationless and the air flow is free from pulsations. They can be located in dusty rooms, as the drive is direct and all working parts are enclosed. In many plants they have proved their reliability in long, continuous service under the severe conditions of cement mill operation. Write for our bulletin C-3A, for preliminary information on these interesting machines.

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Rock Products
With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Volume XXXVIII Chicago, August, 1935 Number 9

Recovery Progress—Trends—Editorial Comment

THOSE WHO CLAIM to enjoy business because it is a gamble should be in their element now, for conditions, circumstances and chances change so fast that even an editor can hardly keep abreast of them. During the past month the President, among other rapid changes of mind or policy has urged the passage of radical legislation, whether Congress is doubtful of its constitutionality or not, and he has so modified the regulations regarding public works spending, especially in regard to highway construction and grade crossing elimination, that there is now some prospect of activity in the rock products industry before winter. And, in spite of all the confusion, private construction and general business activity are unquestionably gaining.

The first monthly report of NRA following the Supreme Court decision which outlawed the codes shows 5,779 cases of deviation from labor standards—3,016 cases of lengthening the work week, or day; 549 cases of wage cutting; and 2,214 cases involving violation of both code wages and hours. This is only half the number of violations reported monthly when the codes were supposed to be enforceable, so it is assumed that many violations are not now being reported. Price-cutting is charged more frequently than any other violation of the former code trade practice provisions. These figures refer to industry as a whole, and the compilation shows labor provisions violated most frequently in New York, California, Texas, Massachusetts, Georgia and Nebraska; price cutting most frequent in Michigan, New York, Ohio, Tennessee, California and South Carolina.

In the rock products industries producers generally have been urged to live up to their codes by national and local associations; in most instances have promised to, "so far as they can," and apparently have done so, in the majority. As yet violations have not been numerous enough to cause any general price cutting; but with business so scarce, the danger is there and stiff backbones are needed. The industries showing the best morale are, as might have been anticipated, those that did their utmost to make their codes acceptable by voluntary observance. Such industries as lumber, which had what were thought to be iron-clad codes, with enforceable price-fixing, are now in the forefront of those ignoring all provisions of their former codes. At one time nearly all the rock products industries, as well as most others, thought if only a duplication of the lumber code could be obtained for *their* industries, everything would be lovely. Now we know by experience that those who lean on the law, and its enforcement, to make competitors honest or ethical, or both, are the least likely to attain their goal, while those who appeal to the common sense and enlightened selfish interest of their competitors stand a better chance.

Charles Edison, president of the Edison Cement Corp., is a member of the new NRA advisory committee—of course he has other interests but the construction industry should be glad to see such a man in a place of influence and authority. He is a business man and such are needed

Acme Photo

Federal Trade Commission Codes

About 200 industries are said to be contacting the Federal Trade Commission to see what can be done to extend as much as possible of their old codes on a voluntary basis. Of course, the thing that most industries want is some kind of government sanction for open-price filing and enforcement, or observance, of filed terms. Generally industry is continuing this practice, as it should, until the government sees fit to stop it in specific

cases, where its practice in such particular instance, results in monopolistic price fixing. The F.T.C., it is said, will make no generalizations, but will consider each case on its merits, and in industries where it is proved that price posting with terms of sale are for the benefit of the industry and the public, they may be approved in voluntary codes.

The President has recently appointed John Dickinson, former assistant secretary of commerce, to be assistant attorney general in charge of anti-trust law enforcement. This is generally accepted as favorable to safe and sane enforcement of the laws, because Dr. Dickinson is one of the less radical members of the brain trust, and has contributed some sound thoughts at various times on the fallacy of "an economy of plenty," when "plenty" means an unmarketable surplus of staple commodities (see Rock Products, December, 1934, p. 41); and he evidently is thoroughly convinced of the necessity of limiting production of agricultural staples. Therefore, he should have at least an understanding attitude toward all industry, which seeks some degree of stability of prices and production by legitimate methods.

The American Bar Association at its recent annual convention at Los Angeles, Calif., reported through its commerce committee: "Collective action consistent with economic and industrial situations and requirements should be sanctioned by our laws in order to harmonize the law with economic facts. Business needs authoritative definition of the proper limits of coöperative action under the anti-trust laws, which it was the purpose of NRA to provide. Only Congress and the state legislatures can give such definition." The committee urged vesting authority in a Federal agency to pass in advance on trade agreements and to grant immunity from criminal prosecution under the anti-trust laws to the parties to agreements that are not disapproved. That seems to be the trend of thought among both lawyers and laymen who are giving the matter the most study.

Highway Construction Best Bet

Opinion grows and statistics apparently show that we, the people of the United States, get more to show for PWA money spent on highway construction than for any other of the various ways devised in Washington and elsewhere to get rid of the public's money quickly. A new allocation of $500,000,000 for "farm to market roads" is said to be under discussion. It is doubtful if the administration leaders yet fully realize that the chief advantage of road construction comes from the fact that it is a regularly organized industrial activity and a normally continuing one, not a "made-work" proposition designed merely to put money in circulation.

Our industries may view too rapid improvement of our highways as robbing the future of the prospect of highway business, particularly in the case of farm-to-market roads, or secondary roads, as they are constructed under present conditions with relief labor and side-of-the-road materials. That fear is justified but on the other hand annual requirements for maintenance will be greatly increased, and this should under normal conditions, according to past experience, come from commercial producers.

Government Loans to Industry

Probably all Rock Products readers are aware that the Federal Housing Act was amended to permit loans for commercial and industrial buildings up to $50,000. We have not heard of any producers taking advantage of the government offer to build new plants or offices, but this issue of Rock Products does contain two news items which show that the Reconstruction Finance Corporation is actually making direct loans for such purposes. In one of these instances, with the help of the political influence of a local congressman, it is reported that a cement plant promotion will be largely carried out and a now half finished plant will be completed chiefly with Uncle Sam's money.

As to the merits of this particular case we have no first-hand knowledge, but it is easy to see that politics and loans to finance industrial promotions may lead us into industrial chaos, and it illustrates admirably why all men of business are so chary about the government taking an active part in any business—banking included. To some extent, doubtless, Uncle Sam's money (meaning yours and mine) was used by bankers in times past to finance new and unnecessary competition. But commercial bankers were led by the incentive of expected profit, and the promotion was at least in some degree tested on that basis. No real banker ever capitalized incompetency knowingly. Unfortunately, the same can not be said for government bankers susceptible to political pressure.

Tighter Specifications

In his enlightening report on government competition in the sand and gravel industry, as chairman of a committee of the National Sand and Gravel Association to combat this competition, E. Guy Sutton recommended "highly restrictive specifications." Such specifications are coming for all concrete in important United States government work, whether producers like it or not—for sand, anyway.

California constructors and engineers for several years now have been leaning more and more to sand specifications which require much more fines, and much better grading from coarse to fine, than any natural sand has. Our own editor, Edmund Shaw, has continuously kept the subject alive in Rock Products, as has also Stanley M. Hands, of the California State Highway Department. The latter, who made a specialty of producing accurately graded aggregates in Iowa a few years back, tells in this issue how one of the progressive West Coast sand and gravel producers is making *premium* specification sand.

We know of a producer who has spent a fortune learning how to make a sand graded to U. S. Army Engineer department specifications which makes stronger concrete with less cement than has been accomplished before. This producer is out of pocket the cost of this experience at the present time, but he knows he is going to have mighty little competition in making that kind of sand in the future. The question for each producer to decide is: Does he want to pay that price for an exclusive market? Does he want to hasten or delay the adoption of such specifications?

Insurance Carriers in New York State Object to Silicosis Risks

A PROPOSAL by insurance companies that workmen exposed to silica and other dust hazards submit to compulsory physical examination under threat of discharge, before their employers can obtain Workmen's Compensation Insurance after September 1, 1935, when the all-inclusive Occupational Diseases Amendment to the Workmen's Compensation Law becomes effective, was termed "an extremely undesirable procedure" by Industrial Commissioner Elmer F. Andrews in a letter to George Meany, president of the New York State Federation of Labor, made public:

Mr. Meany had requested Commissioner Andrews to clarify certain phases of the new occupational disease section of the Workmen's Compensation Law enacted at the last session of the Legislature because "a great deal of confusion seems to have arisen." Mr. Meany saw this confusion increased by a recent letter from the State Insurance Fund which "leads the policyholder to believe that silicosis and other harmful dust diseases are not included in the occupational disease law."

"So far as the circular letter is concerned," Commissioner Andrews advised the Federation official, "that letter merely refers to a blanket increase in all compensation rates which was approved by the Superintendent of Insurance and which became effective July 1. Of this increase, 1% represented an addition to care for the all-inclusive occupational disease amendment to the law, but those classifications of industry where there is a dust or silicosis hazard will have their rates further increased. It is expected that the Compensation Insurance Rating Board will, before September 1, ask for increases for such industries as foundries, granite and monument works, quarries, sand blasting, etc., to cover the silicosis hazard in those industries. This is what the State Fund letter explained—not that silicosis would be excluded from the all-inclusive occupational coverage of the amended law which is effective September 1.

"As to your statement that insurance companies are notifying the policyholders that their men must be examined for silicosis before next September on the threat of cancellation of policies, may I say that I agree with you that this is an extremely undesirable procedure. In the first place, from the standpoint of the cost of insurance, it makes the workers claim-conscious, and more important still, it has a serious effect upon the morale of the men by exciting them about their physical condition. Then, too, if men are ruthlessly discharged, they of course have recourse to civil action against their employers because of the physical impairment which arose in the course of their past employment.

"As you know, these civil actions in the past have resulted in large awards to the workers or their widows or other survivors and have been a large drain upon the reserves of industry. This was one of the factors in the support given by industry to the Silicosis Bill enacted at the last session of the Legislature but vetoed by the Governor because of the high rates which insurance companies said would have to be charged if the bill became law. Although it is true that workers who are members of labor unions have usually refrained from filing civil suits because to do so might have forced their employers out of business and also because the workers prefer wages to uncertain and delayed court awards, if a policy of physical examination and elimination of affected workers from employment is adopted by employers, either voluntarily or under the compulsion of their insurance carriers, it may be that those workers will follow the example of employes in open shop plants in bringing civil suits. Such a development would be unfortunate in its effect upon industry, employment and the morale and actual health of the workers. Physical examination of employes who have spent many years of their working lives in an industry would be justified if there were some method of compensation for those wage-earners who, while not disabled in the sense that they are unable to perform work, are found to be suffering from dust disease in some stage.

"The proper approach to the reduction in cost of Workmen's Compensation Insurance to industry or the prevention of any increase in cost because of silicosis being under the Workmen's Compensation Law after September 1, is, as you say, a real effort by industry to remove dust hazards. Your suggestion that this might be a coöperative movement of employers, employes and public authorities is excellent. You may be sure that this Department will do everything possible to aid such a movement. As a matter of fact we are setting up a new unit in our Division of Industrial Hygiene headed by a physician of fine reputation and knowledge in pulmonary diseases to concentrate on the study and prevention of dust disease.

"As to the alarm—real or assumed—with which some insurance companies are viewing the cost of coverage on risks where there may be a silicosis hazard after September 1, and the alarm they are spreading to their policy-holders and through them to their workers, may I say that I consider this excitement greatly exaggerated. No workman on September 1 who was able to do a day's work on August 31 would quit work with the idea of bringing a claim before this Department and receiving an award. Compensation awards can only be made when an employe is unable to work or else when he can prove he has a decreased earning capacity.

"In all probability there will be a silicosis bill introduced next January in the Legislature and, if acceptable to workers and employers, will probably be passed. If this materializes, silicosis will only remain within the all-inclusive occupational disease law from September 1 until early next year and I cannot conceive how in that time there can be any greater number of claims for silicosis upon which awards would be made by this Department and affirmed by the Industrial Board.

"In the meantime, it is for all of us who are interested in the prevention of dust diseases for the benefit of both industry and workers to do what we can to make prevention effective."

International Quarrying Conference

S. McPHERSON, secretary of Institute of Quarrying (Great Britain), reports that the first attempt to hold an International Conference for the Quarrying Industry was so successful that it is likely to be repeated, although not next year. He says: "Like the International Road Congress, it would not be possible to make this a yearly or even a biennial event; possibly it will be decided to hold it every four years, and England is not likely to be the place of meeting of the next one. Very strong invitations have been received from Germany and America for representatives of this country to visit them and attend one of their Congresses, and tentative arrangements have already been made for some members of the Institute to visit America next year.

"At Buxton there were three delegates from America, four from Germany and one from France. Unfortunately the delegate from Belgium was at the last moment prevented from attending. Norway did not send a representative this year, but as a branch of the Institute has been formed there, it is very possible that we can expect one or more from that country to join us at Bournemouth in 1936.

"W. E. Farrell of America brought with him a letter from the president of the National Crushed Stone Association, which we give below:

Office of the President,
Columbian Buildings, Columbus, Ohio.

British Institute of Quarrying,
Buxton, England.

Gentlemen—

As president of the National Crushed Stone Association, and on behalf of the producers of crushed stone in the United States of America, I extend to you greetings and congratulations.

May your Convention session prove both interesting and profitable, and may your industry benefit greatly through the activities of your Institute of Quarrying.

Quarrying problems are undoubtedly more or less similar the world over; it is our wish that you may be successful in your attempts to solve your industry problems, just as we in America are hopeful of some measure of success in the solving of our problems. Cooperation between members of the industry and with manufacturers of quarrying equipment will accomplish much.

Be assured that I welcome this opportunity of greeting you.

Presented through our mutual friend, Mr. W. E. Farrell, President of the Easton Car and Construction Company, on behalf of

Yours very truly,
RUSSELL RAREY, President,
The National Crushed Stone Association,
U. S. A.

Manufacture of Finer Sands for Concrete

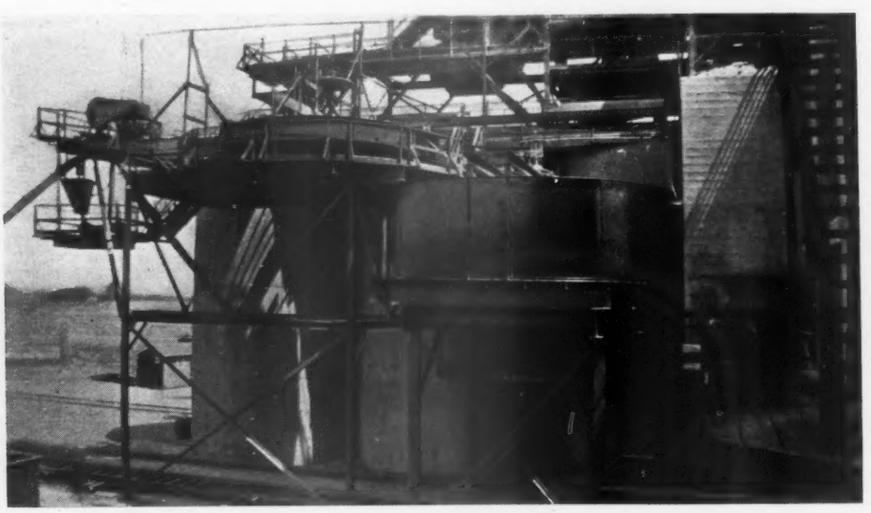
By Stanley M. Hands, C. E.,
Associate Physical Testing Engineer, Bay Bridge Unit, State of California

THE DEMAND for finer sands for use in making portland cement concrete is causing some producers to manufacture grey hairs. Segregating and reblending the finer portions of natural deposits is not a complicated operation providing the processor will provide equipments designed to separate according to natural law, and then regulate his blend according to the desired design of the size composition of the finished sand. Blending, of course, does not mean just throwing this much of that and that much of this into a car. It means well mixed throughout, in order that the purpose of using such sand may be uniformly operative.

The primary purpose in using finer sands is probably to secure workable concrete of essential strength without free water. Technically there are a number of reasons for avoiding free water. One of these is a desire to get uniform strengths. Fine sands gather and hold the water uniformly throughout a well-mixed mass; and because of their cohesive properties when mixed with water, these sands will prevent not only the segregation of water but also the segregation of the coarser aggregates.

This paper does not propose to discuss the use of these sands as factors in the design of a concrete mixture. That is for the engineer who has now written his specifications calling for the finer sands. The producer will want to know how some are meeting the demand; and that these refined products will demand some premium where the specifications are enforced. A report is given here of the methods and equipments used by the Kaiser Paving Co. at the Radum plant in the Livermore Valley. This company's premium was derived not from the sale price of the sand, but from the fact that they also cut the costs of mixing and delivering concrete for use on the San Francisco Oakland Transbay Bridge because of a noticeable increase in capacity after the finer sands were used in the concrete mixtures.

If a producer will insist that the intent of the specification be realized by rigid enforcement, that workability be secured with aggregates rather than water, the contractor, by his experience in mixing and placing, will find that correctly blended fine and coarse sands are worth a premium. It must be recognized that the profitable margin to the producer of the aggregates is an insignificant part of the cost of high class concrete structures.



Elevation view of 20- and 28-ft. sand separators used by Kaiser Paving Co. for reclaiming fine sand

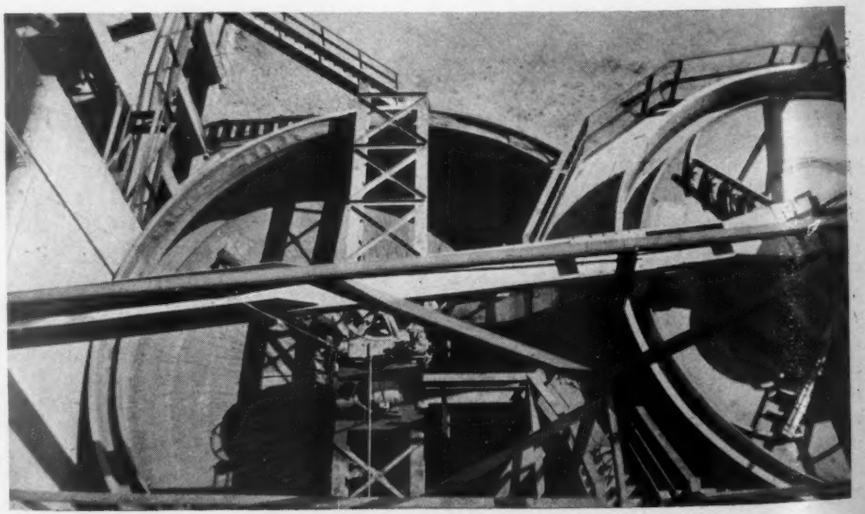
Reclaiming Fine Sand for Concrete

In order to comply to the increasing demand for finer sands for concrete the Kaiser Paving Co. installed at its Radum plant a 28- by 8-ft. Dorr hydroseparator. This machine operates as a final reclaimer in a series consisting of a 12-ft. Dorr washer, four double-rake reciprocating 6- and 8-ft. classifiers and a 20-ft. bowl classifier.

The sand is first fed to the primary 12-ft. Dorr washer. This machine discharges the sand to the four reciprocating classifiers and the overflow water to the 20-ft. bowl. The four classifiers then discharge the sand directly to the sand bunkers and their overflow water to the 20-ft. bowl, also.

The 20-ft. bowl acts as a primary reclaimer of fine sand from the overflow waters. This machine consists of a 20-ft. tank with a revolving mechanism to rake the settled sand to the center of the tank where it is delivered to sand pump by a set of reciprocating rakes. The sand is pumped from this point back into the regular classifiers to a point above their water level, where it is thoroughly mixed with the regular sand that is being discharged into the sand bunkers. The amount to be pumped to each classifier is controlled by individual valves in the sand line over the classifiers. By means of these valves it is possible to put all or any part of the sand to any classifier.

The overflow water from the 20-ft. bowl classifier is fed to the 28-ft. hydroseparator. This machine consists of a 28-ft. tank and spiral rakes to bring the settled sand to a cone attached to the bottom of the tank. A 2-in. sand pump is directly connected to the cone through a 4-in. pipe with a gate valve to control the percentage of solids fed to the pump. The material from the sand



Plan view of sand separators

pump is sent to the regular classifiers through a separate sand line where the amount to be put into the various classifiers is controlled through another set of valves as in the 20-ft. bowl operation.

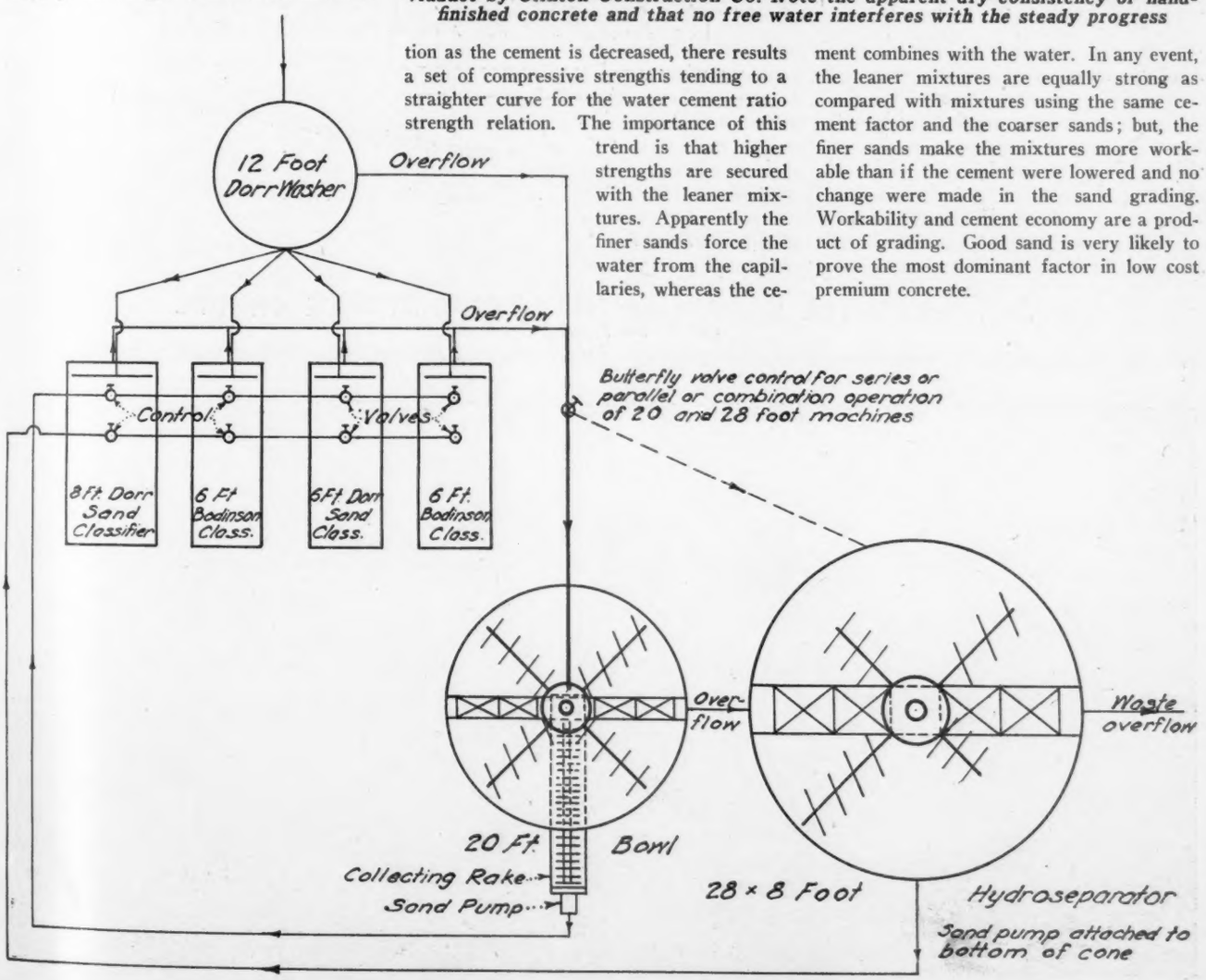
The feed of the 20-ft. bowl and 28-ft. hydroseparator is in such a position that these two machines may be operated in series, as described, parallel, or a combination of both. In the flume feeding the 20-ft. bowl there has been built a butterfly gate that will split the feed to the two machines and operate the machines in parallel. By splitting the feed here and also running the 20-ft. bowl overflow to the 28-ft. machine, a combination of series and parallel operation can be had.

Tests of the final overflow waters from the 28-ft. machine show that the small amount of fine sand that has not been reclaimed consists of 75% minus 200-mesh, which is not a desirable product.

Recent Tests on the Use of Fine Sands

Recent tests on the use of fine sands for portland cement concrete indicate that if fine sands are properly blended with coarser sand by increasing the minus 30-mesh fraction as the cement is decreased, there results a set of compressive strengths tending to a straighter curve for the water cement ratio strength relation. The importance of this trend is that higher strengths are secured with the leaner mixtures. Apparently the finer sands force the water from the capillaries, whereas the cement combines with the water. In any event, the leaner mixtures are equally strong as compared with mixtures using the same cement factor and the coarser sands; but, the finer sands make the mixtures more workable than if the cement were lowered and no change were made in the sand grading. Workability and cement economy are a product of grading. Good sand is very likely to prove the most dominant factor in low cost premium concrete.

Placing roadway paving and girder concrete for Yerba Bueno Island upper deck viaduct by Clinton Construction Co. Note the apparent dry consistency of hand-finished concrete and that no free water interferes with the steady progress



Flow sheet of fine sand reclaiming plant of the Kaiser Paving Co.

Development of a Low Cost Water Supply for Stone Rinsing

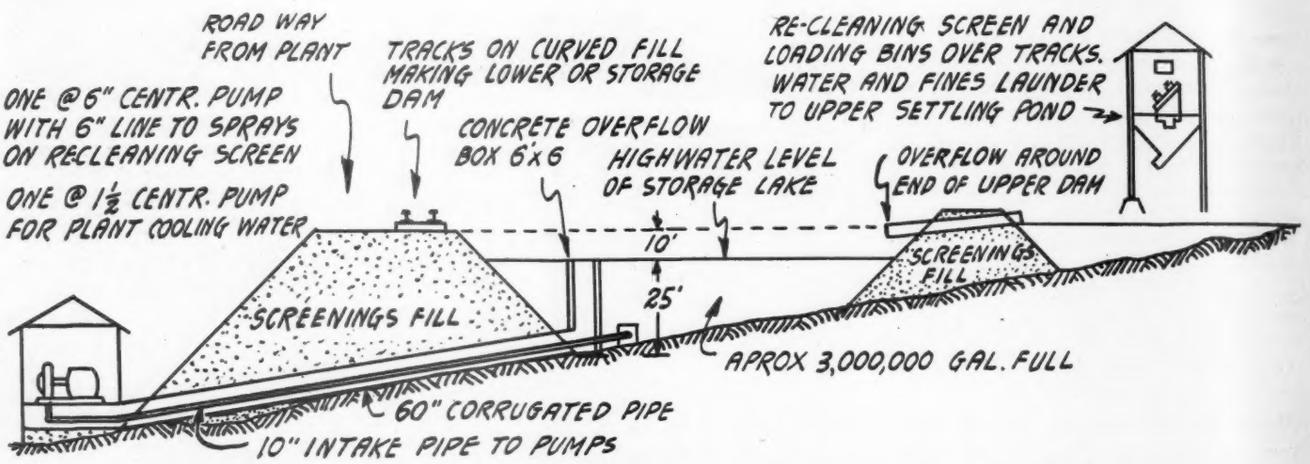
By Nelson Severinghaus
Superintendent, Consolidated Quarries Corp., Lithonia, Ga.

THE ACCOMPANYING SKETCH illustrates the major features of a water supply system developed at the Rock Chapel quarry of Consolidated Quarries Corp. during the past three or four years. Both dams are built entirely of unsalable excess screenings. The lower fill was started by dumping hopper cars on the original railroad trestle and widened for a roadway beside the track with small dump trucks. The upper settling pond dam was built entirely with screenings disposal dump trucks.

Water supply for this system comes mostly from rain water run-off. The area draining to the two lakes is roughly 500 acres. There are several small springs above the ponds, but these are practically dry in dry weather. Because all water used goes back into the system and storage is quite large, we have had no trouble with shortage even with extended dry spells.

Location of the pump house with pressure feed to the pumps obviates all priming difficulties and makes the pumping unit reliable with very little attention. An 800-g.p.m. Allis-Chalmers centrifugal pump for 100 ft. head is connected by 6-in. pipe direct to sprays on a 4 ft. x 7 ft. double deck Hummer, type 60, recleaning screen above the loading bins. Water and fines through the bottom screen section are dumped into the upper or settling pond by a short launder.

The rinsing of practically all stone shipped has reduced complaints on fines and dust almost to nil and has proved well worth the cost, even though there is no quarry overburden at Rock Chapel to trouble.



SECTION THRU WATER RECLAIMING AND STORAGE AT ROCK CHAPEL
(Not to scale)

Plant of the Consolidated Quarries Corp., showing water-supply pond

Crushed Stone

Consolidated Quarries Co., Lithonia, Ga., tried a "Nitramon" blast on May 14. The "shooting" was attended by officials of the E. I. du Pont de Nemours & Co. and other explosive manufacturers. The following data was obtained by a ROCK PRODUCTS editor from the quarry company officials:

Pounds of Nitramon loaded	14,825
Tons of rock produced	57,580
Average spacing of holes	31.6 ft.
Average burden	15.7 ft.
Average depth of holes	102.0 ft.
Number of holes (6-in.)	14

The rock is a granite; 3.88 tons per pound of explosive were obtained at a cost of 3.29c per ton. TNT bombs (Triton) were placed on top of the charge in each hole; double-countered cordeau was connected to the bombs, cap at each end, with a plain trunk line. The No. 4 hole failed to explode.

◆ ◆ ◆

Monmouth Stone Co., Monmouth, Ill., has opened a new quarry and built a crushing and pulverizing plant. Glenn Kistler, Monmouth, formerly of Buffalo Prairie, is the manager and Clyde Rausch, Viola, is production superintendent. Mr. Kistler is a civil engineer and has had much experience in the War Department. Eight men are employed at the plant and more will be added as the demand for the rock increases. Retaining walls will be placed so that trucks may be loaded directly from the chutes. Compressed-air drills are used. Steam is used for power.

◆ ◆ ◆

Bailie Anderson, Appling, near Grovetown, Ga., is supplying 20,000 tons of granite rip-rap to the Morrison-Glascock Co., contractors for channel improvement work on the Savannah river. The rock is being hauled from quarry to job by motor truck.

◆ ◆ ◆

Inland Lime and Stone Co., Manistique, Mich., it is reported locally, will construct additional dock facilities, including concrete tunnels, belt conveyors, and stock piling equipment. It is said the new facilities will provide for shipping dolomite by water transportation as well as high calcium stone.

◆ ◆ ◆

Dr. Samuel Border and **E. J. Border,** Bozeman, Mont., are said to be contemplating development of a nearby limestone (calcite) deposit.

Face of the Consolidated Quarries Corp. quarry

Blasting with a new safe explosive

Another view of the Consolidated Quarries Co. pond—a cheap water supply developed by waste screenings fill for washing crushed stone

Rock Products News Briefs

Crushed Stone

Oregon Lime Products Co., Provolt, Ore., has rented a warehouse in Grants Pass, Ore., to facilitate distribution of its products, which consist chiefly of agricultural limestone and chicken grits.

◈ ◈ ◈

H. & H. Rock Co., San Angelo, Tex., opened a new quarry at Maryneal rather than pump the results of the recent 15-in. rainfall from the one it had been working.

◈ ◈ ◈

Southern Limestone Co., Harriman, Tenn., has changed its quarrying method. Formerly the full 90-ft. face was drilled and shot at one time. Recently the quarry has been worked in 15 to 20 ft. benches. Well drills were discarded in favor of six Gardner-Denver pneumatic hand-hammer drills giving holes 2½-in. in diameter at the top and 1¼ in. at the bottom. In the blast illustrated herewith, 51 holes, spaced 4 ft. apart and 8 ft. back from the face, were shot at one time. The depth was 20 ft., and the charge 16 sticks of dynamite per hole. The crushing plant has recently been redesigned to bring the crushers down to ground level. A 40x20-in. roll crusher was recently added to provide more minus 1-in. stone.

◈ ◈ ◈

Lime

Knoxville Lime Manufacturing Co., Asbury, Tenn., has been incorporated to take over the lime plant and lime business of the **Knoxville Sand and Lime Co.** The officers are E. L. Osborne, Atlanta, Ga., president; W. W. Cowan, Knoxville, secretary-treasurer, and John Wray, Knoxville, director. Mr. Osborne was president and Mr. Cowan vice-president of the Knoxville Sand and Lime Co., which is controlled by Mrs. J. P. McDermott, Knoxville. Mrs. McDermott bought their interest in the parent company, which produces and retails sand, gravel and other building materials, and they will devote all their attention to the lime business.

◈ ◈ ◈

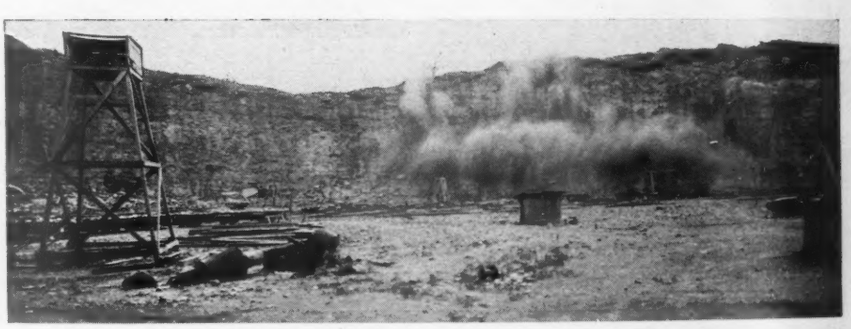
Calerea Santa Teresa Hydrated Lime Co., Havana, Cuba, recently shipped to Miami, Fla., a car of hydrated lime, said to be the first ever imported from Cuba to the United States. In connection with the shipment, Antonio Gelavert, president of the Calerea Santa Teresa Lime Co., was a visitor in Miami arranging business matters of the company. The Havana concern in past years has exported large quantities of its product to Venezuela, Panama, Canal Zone and Mexico, as well as numerous other South American countries. Mr. Gelavert said that the lime was used almost exclusively in the construction of Cuban government buildings, including the capitol and presidential palace.

Ohio: State now has 58 municipal water-softening plants. Seven were recently put in operation, five were financed by PWA. Most of them use lime.

◈ ◈ ◈

Riverton Lime and Stone Co., Riverton, Va., has been incorporated to take over and operate the former Riverton Lime Co. under a financial reorganization plan, by which bond holders received 7% preferred stock in place of their bonds. According to local newspapers the reorganization involves no changes in the officers or management of the company, but the company will be greatly strengthened financially as a result of the new arrangement. The reorganization plans involve a trustee's sale of the property under an existing trust deed in order to straighten out all the technical legal phases of the transaction by proper court procedure. The Riverton Lime Co. is one of the outstanding lime manufacturing plants of the country. Rapidly expanding business and the necessity for enlarging the company's financial structure to meet new needs were given as reasons for the reorganization.

Southern Limestone Co. quarry before blast



Bench blasting proved more efficient than breaking down the whole face in one operation

Close-up of recent shot showing excellent fracturing

—Courtesy Dallin Aerial Surveys, Philadelphia, Penn.

This aerial view clearly shows the relative positions of the various units of the plant.

Recently Completed Plant of the National Portland Cement Company, Brodhead, Penn., Is Receiving Many Visitors from at Home and Abroad

World's Newest Cement Plant

By George M. Earnshaw

THE NEWEST cement plant in the Lehigh Valley was built over the protests of the organized industry as an unnecessary addition to a large unused capacity. The leading figure in the organizing and promotion of the company and the building of the plant is the well known Fred B. Franks, Sr., whom the cement industry has come to recognize as possessing a remarkable special aptitude and organizing ability in the promotion of cement plant projects. The National plant is the fifth one built by Mr. Franks.

It is not the purpose of this article to discuss the economics involved; the plant has been completed; it is operating to capacity; it is being visited by cement manufacturers from this country and from all over the world. Those responsible for its completion and present operation will undoubtedly use it as a demonstration plant, where this new machinery and processing will be thoroughly tested.

It was to be expected that this new plant would be "different, most modern and highly efficient," if for no other reason than that it is the first new one built in the United States in the last six years. Such expectations are justified, for the now finished plant and operation as a whole is different from any other in this country and is as modern and efficient as some of the world's best designers, engineers and machinery manufacturers could produce.

The first of the two kilns was fired on March 15 and the second on April 15, this year. Since the latter date, daily production of finished cement has averaged 3,600 bbl., which is the rated capacity. However, the plant has produced as high as 3,800 bbl. in a day. As for the quality of the cement, the following tests tell their own story. They were made on June 23.

The above tests were approximately average of those taken during the two weeks previous. Daily variations were unusually slight.

Quarry and Crushing Plant

The quarry was opened as near the crushing plant as possible and at present its floor is about 60 ft. below the floor level of the crusher house. Remarkable speed has been made in the development of the quarry, which eventually will have a working face about 75 ft. high and several hundred feet long. The stone deposit has a clay overburden averaging from 5 to 10 ft. in thickness, which at this time is being trucked to a dump storage, later to be reclaimed and processed. Due to the newness of the quarry at this time, there is sufficient clay naturally mixed in the stone, making it unnecessary to handle and process clay separately. The mixed stone and clay are loaded by two P. & H. electric shovels with 2-yd. dippers. A fleet of twelve 8-yd. Atlas steel cars and a 12-ton Vulcan locomotive handles these raw materials between the quarry and the incline to the crushing plant on standard-gage track.

SLURRY

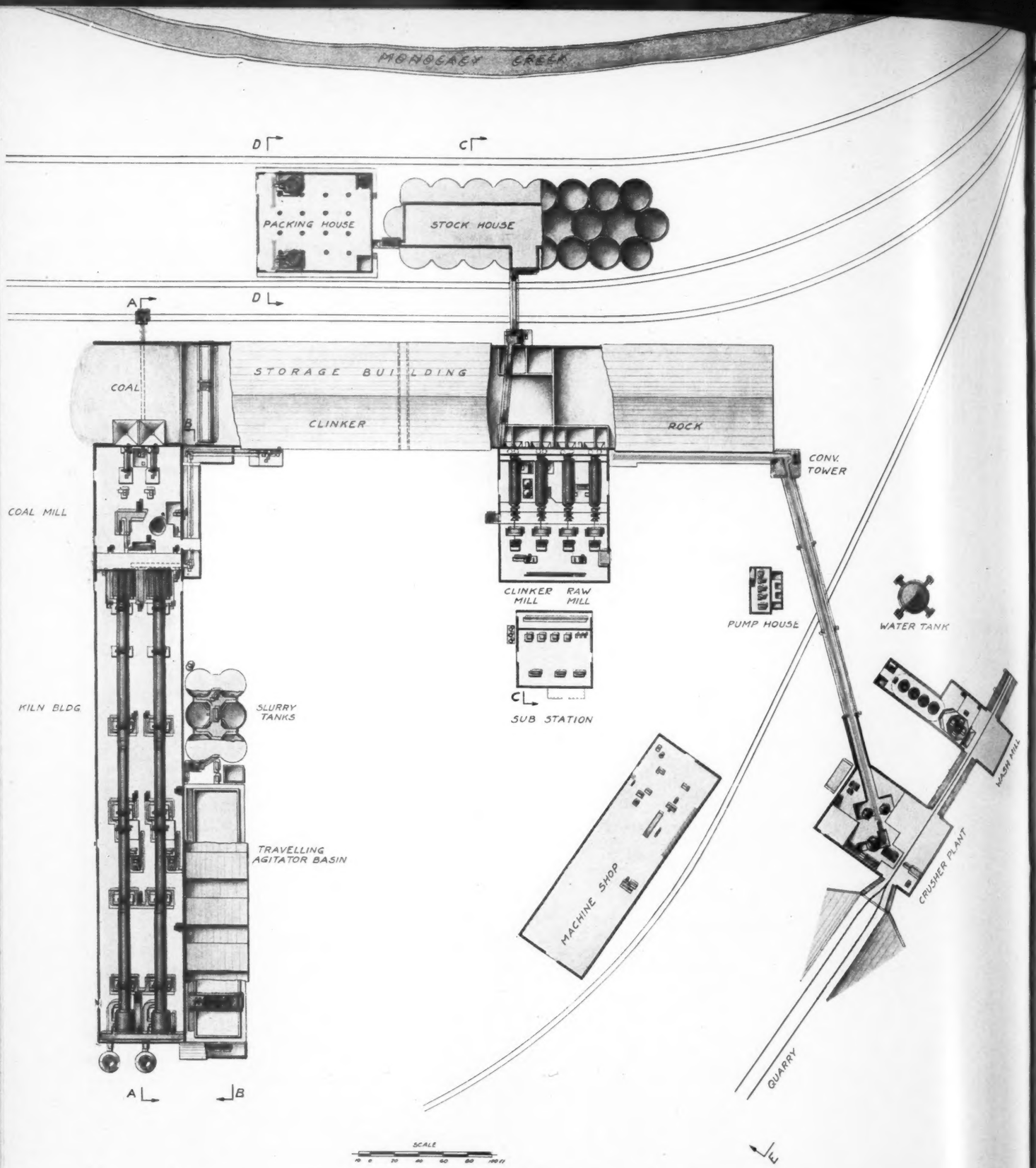
	Raw Mill	Kiln Feed
Fineness through 200-mesh	91.3%	92.2%
$CaCO_3$	77.9%	76.5%
$\%H_2O$	35.7%	37.0%

CEMENT

Physical		Chemical	
Fineness through 200-mesh	99.3%	SiO_2	22.00%
Fineness through 325-mesh	93.0%	Al_2O_3	4.91%
Specific surface	1847	Fe_2O_3	2.45%
Soundness	O.K.	CaO	63.95%
Initial set	3.40 hr.	MgO	2.83%
Final set	5.45 hr.	SO_3	1.76%
		Loss	1.24%
		Total	99.14%

Tensile strength	
1 day	205
3 day	333
7 day	390
28 day	488

Silica ratio	2.99
Lime ratio	2.18



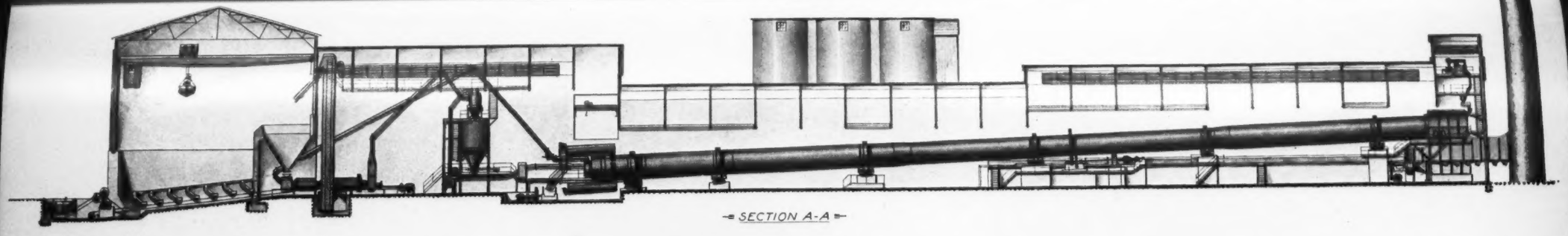
Plan of the plant of the National Portland Cement Co., Brodhead, Penn.

The major drilling is done by contract with Keystone and Armstrong blast-hole drills, and secondary drilling with Ingersoll-Rand "Jackhamers." Air for the secondary drilling and for agitation in the clay storage basin is furnished by a two-stage, 250-c.f.m., Fuller rotary compressor. At the time of our visit, Atlas explosives were being used.

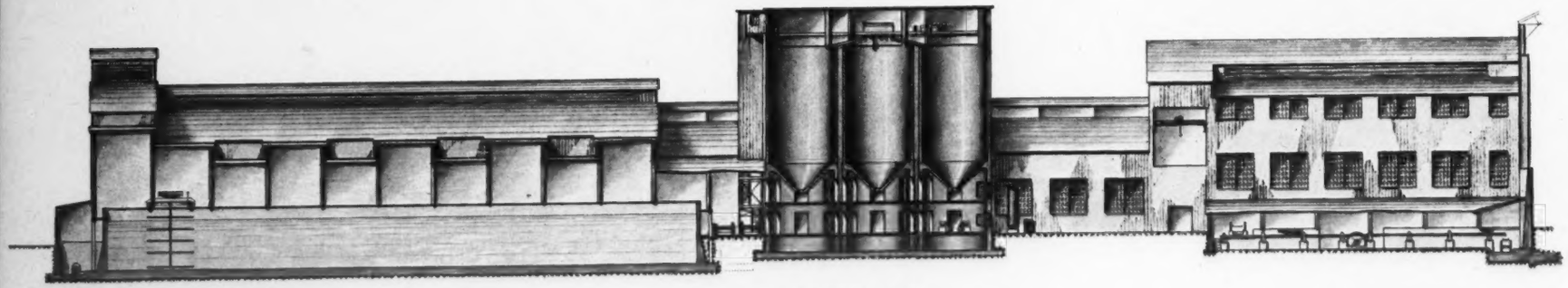
Crushing and Screening

The crushing and screening plant, while new and modern in every respect, is more or less of the conventional design. Cars of stone or clay are pulled up the incline one at a time to the crusher floor level by a double-drum Vulcan hoist. They are dumped by an Easton Car & Construction Co. automatic dumper, operated by a small Lidgerwood hoist, into a steel hopper. A 48-in. pan feeder is the connecting link between the hopper and primary crusher. The latter is a No. 36 Kennedy-Van Saun gearless gyratory. The pan feeder, bucket elevator, screen and secondary crushers were also furnished by Kennedy-Van Saun.

The primary crusher is set to discharge at 8 in., and its product flows to a chain-roller elevator to a vibrating screen. Rejections from the screen flow to one compartment of a 2-compartment bin, and the product of the screen into the other compartment. The over-size is fed to two No. 49 secondary gyratories and the material from them, and that passed through the vibrating screen, feeds to an inclined 36-in. Jeffrey

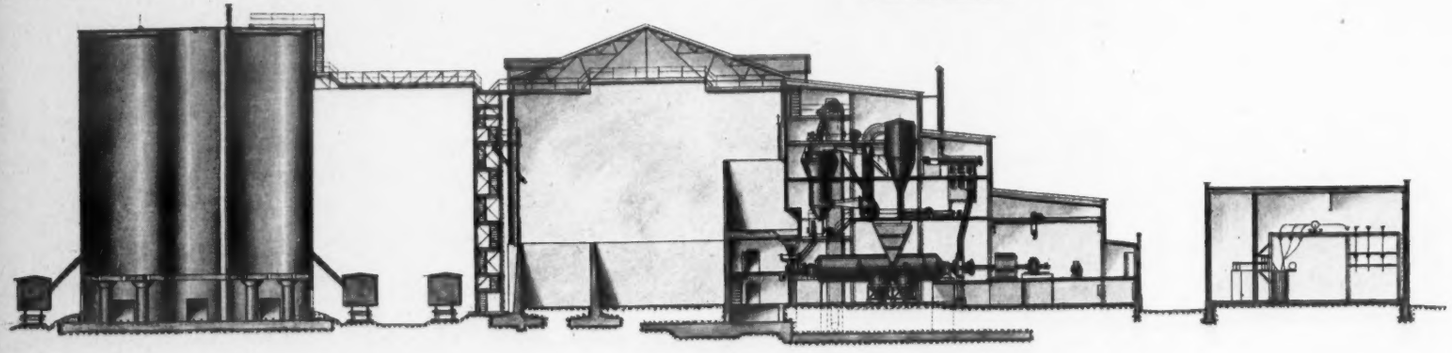


SECTION A-A

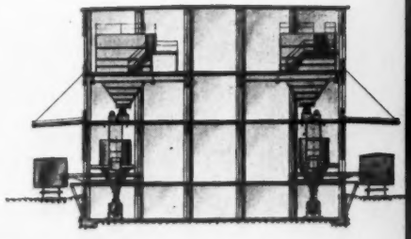


SECTION B-B

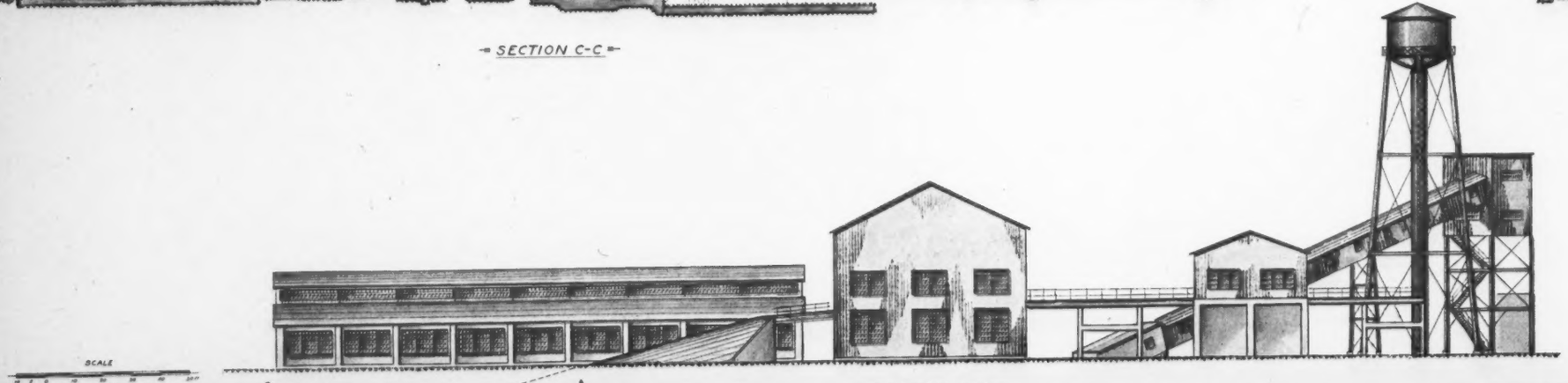
Elevation and cross-sectional details of the National Portland Cement Co. plant, Brodhead, Penn.



SECTION C-C

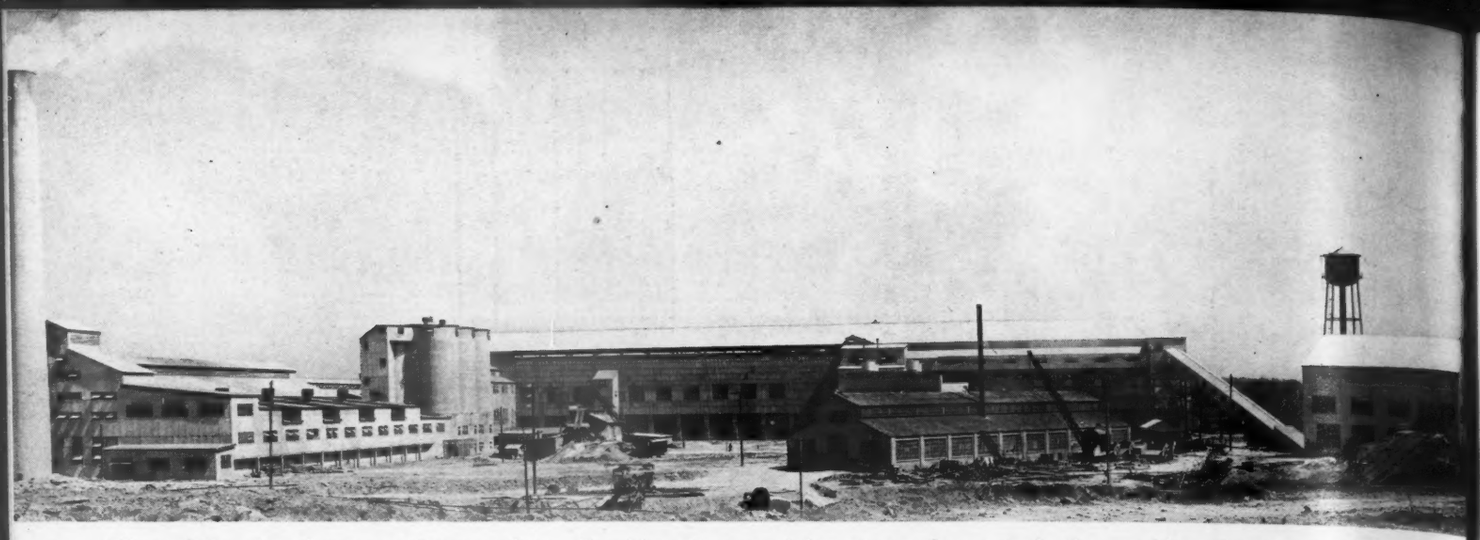


SECTION D-D



SCALE

SECTION E-E



View of the plant from top of quarry face. Crushing plant at right; center foreground, the machine show; center, rear 550-ft. long general storage building; and at left the kiln building, slurry silos and storage basin. The cement silos and packhouse, not shown, are behind the storage building

belt-conveyor, 300 ft. centers, leading through an enclosed gallery to the general storage building. Here another 36-in. belt conveyor distributes the stone to any desired point within the conveyor's 180-ft. length, by means of an automatic tripper. The end of the distributing belt is directly over the raw mills' feed bins so that the bins can be filled directly from the conveyor, thereby eliminating extra handling.

The clay-processing plant is beyond the crushing plant, from the quarry, and cars of clay will be pulled through the crusher house to it. This plant consists of a 24-ft. F. L. Smidth Co. wash mill with mechanical agitation. From the wash mill the clay flows, with a 60% water content, to a 50x20x20-ft. storage basin, also equipped with mechanical agitators in addition to compressed air agitation. From this basin the clay is moved by a 3-in. Wilfley pump to Smidth scoop feeders serving the raw grinding mills.

Cement Plant Proper

The accompanying photographs and drawings comprise in themselves an almost complete description of the plant and for that reason the following text matter will be confined only to description not readily seen in the illustrations.

The general storage building is 550x80 ft., divided in the usual way for the various materials, including separate sections for high-lime and low-lime stone. The crane is a 10-ton P. & H. with 3-yd. Blaw-Knox bucket. Each of the two raw mills has two stone bins; one for high- and one for low-lime stone, 400 tons each. The material is fed to the raw mills by standard Smidth table feeders. The mills are 8x36 ft., 4-compartment, and carry a charge of 60 tons of grinding media. There are four mills; two each for raw and for finish grinding. The former are driven by 800-hp. synchronous motors and the finish mills by 900-hp. motors of the same type, through Smidth Symetro Drive speed-reduction units. The motors, reducers and main switchboard are housed in a separate room, which also houses a 400-hp. Hall-Scott gasoline engine emergency unit, which has sufficient capacity to keep the kilns turning while cooling; to furnish power for slurry agitation and to furnish lighting, in the event of power failure from the outside. Incidentally, both raw and finish grinding is done at night in order to avoid peak-load power rates. All motors and electrical equipment in the plant were furnished by Westinghouse, whose engineers worked with the E. M. Gilbert Engineering Corp. in the design and installation. An exceptionally interesting feature of the National plant is its electrical layout. At a later date we expect to publish an article on this phase alone, complete with electrical details covering the entire plant.

Slurry is pumped from the mills to blending silos via a distributing box by a 6-in. Wilfley pump. A similar pump is installed as a stand-by. The silos, of which there are six, are 22 ft. diameter, 40 ft. high and hold 1400 bbl. each. Blending is accomplished by drawing the slurry from the silos to a sump from which another 6-in. Wilfley pump transfers it to another compartment of the distributing box above the silos. The properly blended slurry is then fed to a 35x200-ft. rectangular concrete storage basin, 21 ft. deep. This basin provides storage for approximately 16,000 bbl. It is equipped with a Smidth traveling agitator with three paddle shafts. Compressed air is also used for agitation. From here the slurry is transferred by two 3-in. Wilfley pumps to the kilns via Smidth scoop feeders driven by variable-speed motors, which operate synchronously with the kiln motors. An arrangement of valves permits the pumping of slurry, when desired, from any one of the blending silos direct to the kilns, by-passing the storage basin.

The two kilns are Smidth Unax units with integral coolers and are 372 ft. long. The end sections are 10 ft. in diameter while the center section, about 125 ft. long, is 9 ft. in diameter. The kilns are mounted, with a pitch of ½ in. per foot, on six tires, each of which runs on oil-lubricated adjustable-bearing rollers. The rollers operate in a water-cooled oil bath. Thrust rollers are mounted at the fourth tire and near this tire is the drive ring gear which is attached to the kiln by spring plates. A d.-c. adjustable-speed motor is used for driving each kiln.

Below: The quarry as seen from foot of the incline. The shovel at the right is working toward the drill in the foreground at a lower level

This motor is capable of developing 33 hp. at its lowest speed, and 100 hp. at its highest speed. However, the actual power consumption is only about 45 hp. Each motor is connected to a Smidth speed reducer and each motor is equipped with a solenoid brake to prevent rocking of the kiln when the power is turned off. Slurry feed is controlled in proper relation to the speed of the kiln by means of a Smidth sending unit mounted on the drive shaft of the kiln motor. These units generate current for the adjustable-speed 3-hp. motors driving the slurry feeders. At the time of the writer's visit the kilns were running at the speed of one revolution every 53 sec. The power consumption per kiln averages 45 to 50 hp.

The temperature of the kiln gases entering the stacks is reduced to an average of about 450 deg. F. and this low temperature is attained largely due to the chain system in the feed end of the kilns. Chains are fitted in the kilns for a distance of 76 ft., their function being to hasten the heating and absorption of the slurry and to prevent the formation of rings, with a consequent reduction in temperature of exit gases. The kilns are equipped with draft fans and motor-operated dampers. Gases pass through dust chambers to the stacks, which are 175 ft. high and 8-ft. inside diameter at the top. These were built by the Alphons Custodis Chimney Construction Co., are of concrete construction designed for earthquake stress and are lined their full length with a self-supporting brick lining.

Coal Plant

Coal is dumped from railroad cars into a track hopper and from there it is moved by apron conveyor to hammer mill, to belt conveyor, to inclosed bucket elevator to storage or direct to the 100-tons capacity concrete bins over the two coal mills. Jeffrey Manufacturing Co. furnished the hammer mill, conveyors and elevators. The coal mills are Smidth Tirax combination drying and grinding units and have a capacity of six tons per hour. Smidth fans draw the hot air for the mills from the kiln hoods at a temperature of approximately 350 deg. F. This air is reduced to about 120 deg. at exit from the mills. These same fans move the pulverized coal from the mills to two cyclones from which it is discharged to two 20-ton bins serving double-screw feeders to the kilns.

During the month of June the moisture in the coal fed to the mills was 3 to 5%, and that produced by the mills contained from 0.4 to 1.0% with a fineness of 93.04% through 100-mesh. Each mill ground and dried 9250 lb. of coal per hour. The power consumption for each mill was 87.4 hp. During this period the company found it unnecessary to grind the coal down to the above mentioned fineness, and since July 1 the production of each mill has been raised to 12,200 lb. per hour with a fineness of 90% through 100-mesh, with the same power consumption.

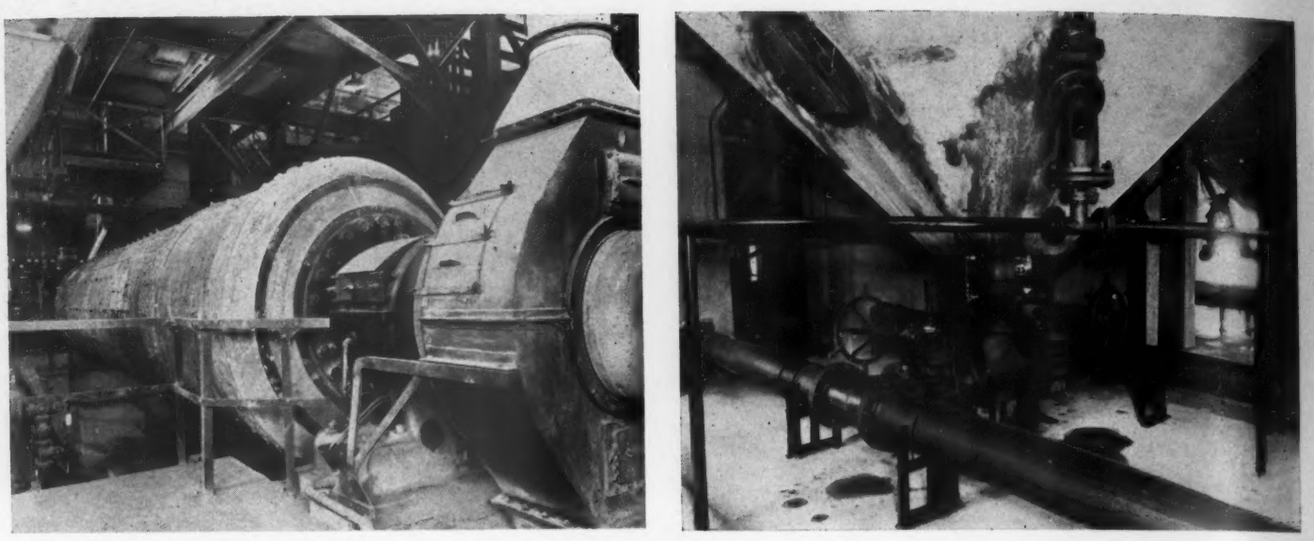
Fuel consumption varies from 900,000 to 1,000,000 B.t.u. per bbl. of finished cement. One specific test showed that with 13,500 B.t.u. coal, the consumption was 69.7 lb. of coal per bbl. of cement, with a slurry moisture of 36.7%. It is expected, after the plant is thoroughly "run in," that moisture will be reduced to 34% with a consequent further reduction in fuel consumption.

Clinker Handling and Finish Plant

The Smidth Unax clinker cooler on each kiln consists of 10 drums mounted around the discharge end of the kiln, each drum containing suspended chain for the agitation and consequent lowering of temperature of the clinker. The average temperature of clinker entering the coolers is around 2000 deg. F. and at discharge, about 300 deg. A Smidth Skipulter receives the clinker from the kilns, discharges to another one set at right angles to it, and from this one to a Jeffrey apron conveyor leading to a Kennedy double-roll crusher. An inclosed chain-bucket elevator takes the product of the crusher to storage, from which it is reclaimed and fed to bins over the finish mills. Gypsum is moved from box cars to a bin in

Stone crushing plant, showing trackage arrangement and type of haulage equipment serving it

Below: ***As the plant looks from the office building. From left to right, cement silos, packhouse, raw materials storage and kiln building***



Left: One of the four 8 x 36-ft. four-compartment tube mills. Right: Close-up of valve arrangement under one of the slurry blending silos

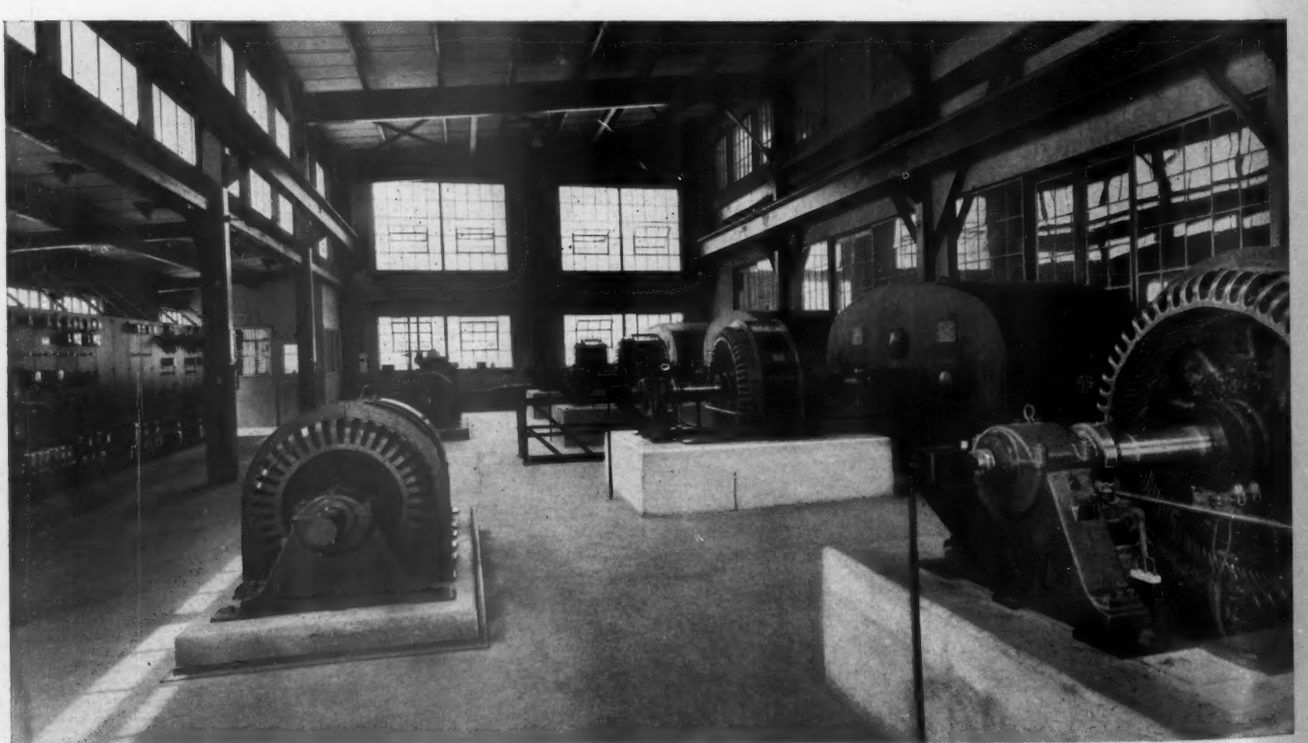
the main storage by an inclosed bucket elevator.

The finish mills, described previously, are especially interesting because they are equipped with air separators working in closed circuit with a cyclone-type dust collector. A combination of fans and airlocks in the system effects the passing of oversize particles back to the mills for further reduction. These units, also furnished by F. L. Smidth & Co., make possible unusually high percentages of fineness through 200- and 325-mesh.

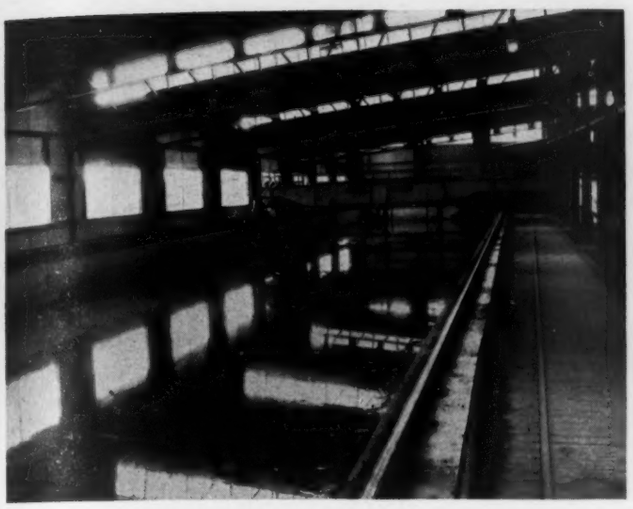
Silos and Pack House

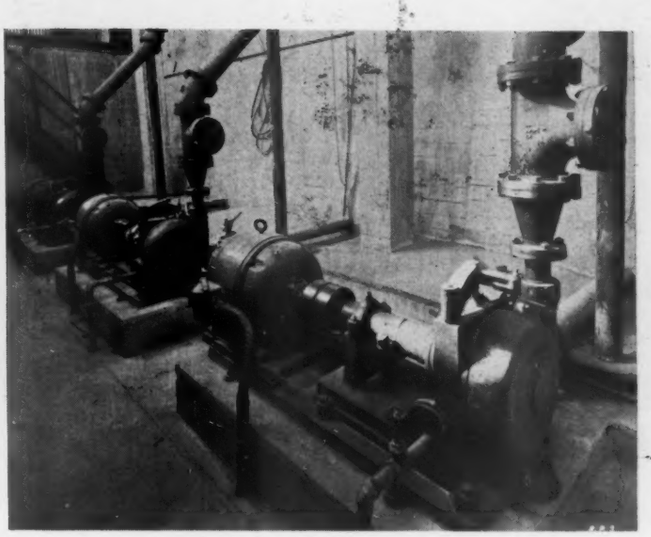
A Smidth Fluxo pneumatic duplex pump under the finish mills' storage bin conveys the cement by pipe line to the storage silos. Air pressure for it is supplied by two Fuller Co. two-stage, 750-c.f.m., rotary compressors which also supply the air for agitation in the slurry silos and storage basin. The usual system of piping atop the cement silos affords diversion to any desired silo.

The silos are in two rows of eight each with a row of five silos between. There are four interspaces and these combined with the 21 silos provide a storage for 250,000 bbl. The silos are 76 ft. high and 25 ft. in diameter. Under each of the three rows is a truck-mounted, 7-in. Fuller-Kinyon cement pump, operating on track and movable to any silo in the row. These three machines pump direct to the feed bins over the bag packers. Side spouts in the silos of the two outer rows provide for bulk loading. Three Fuller rotary compressors of 500 c.f.m. capacity, supply air for agitation of cement in the pipe lines and for agitation in the feeders for the two packers.



Tube mill motors and speed reduction units. Part of the main switchboard can be seen at the extreme left

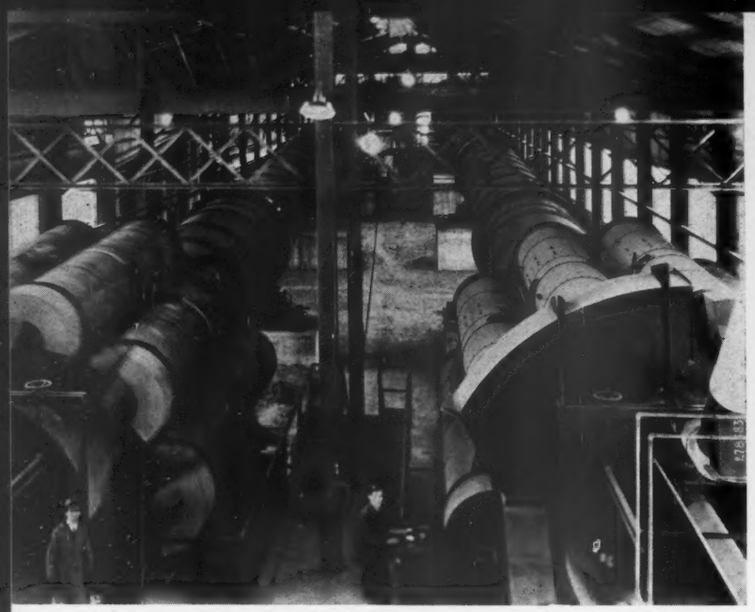


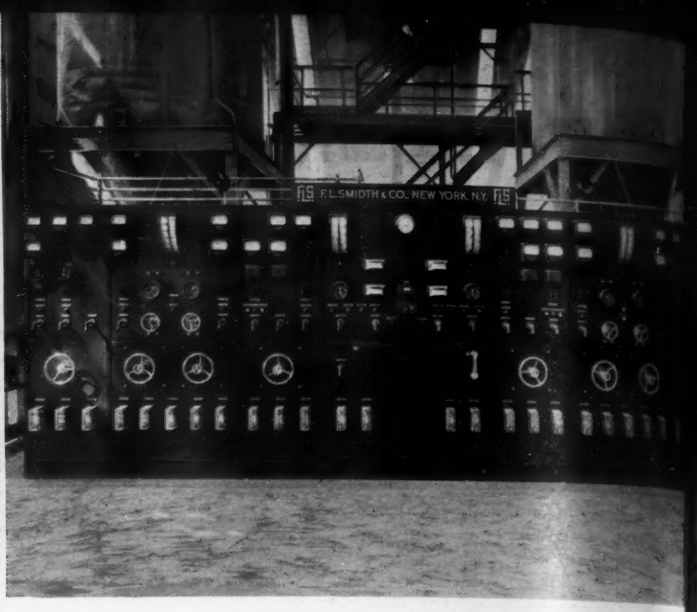


Left: Traveling agitator over the 200-ft. long slurry storage basin. Right: Seven pumps of this type handle all the slurry in the plant

This is one of the first plants in this country to use Smidth Fluxo bag packers. An integral part of each packer is a cylindrical feed tank, having 12 filling spouts, which revolves slowly. The operator is in a stationary position and all he has to do is fit bags on the self-sealing spouts as they come before him. These packers are rated at 1600 bags per hour. Bags are automatically fed,

The two 372-ft. kilns as they look from the feed end





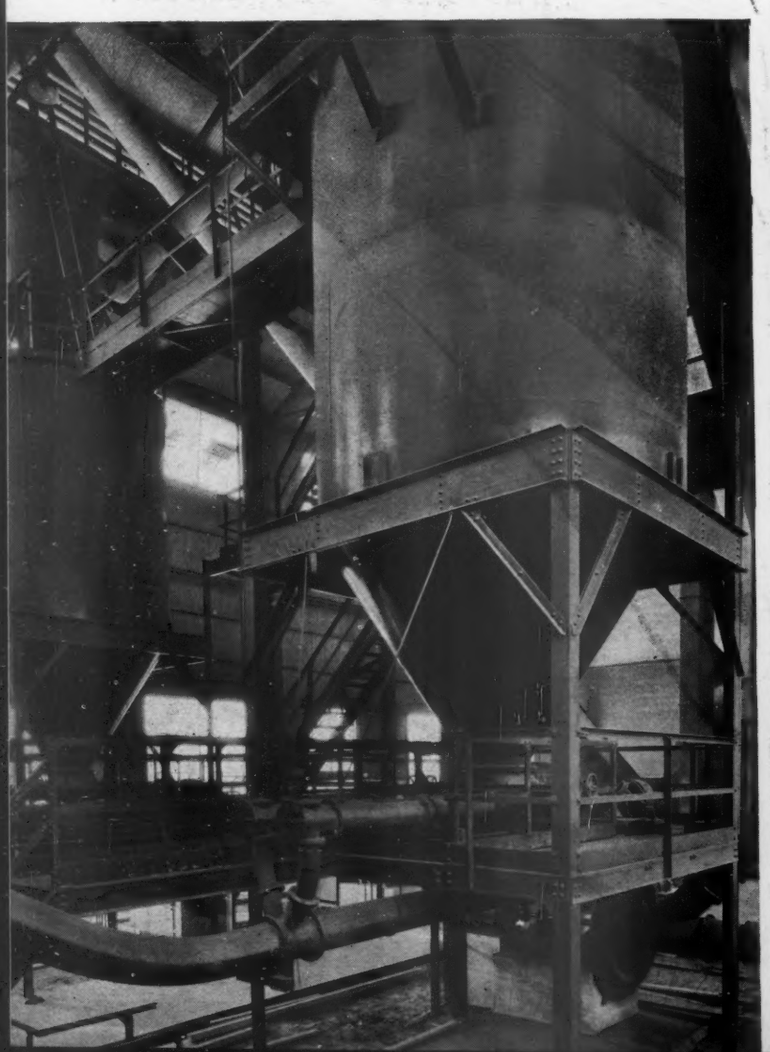
Left: Discharge end of the kilns showing the coolers. This view was obtained before the second kiln (right) was put into operation. Right: Control board on the firing platform of the kilns. Coal bins are shown directly behind the board

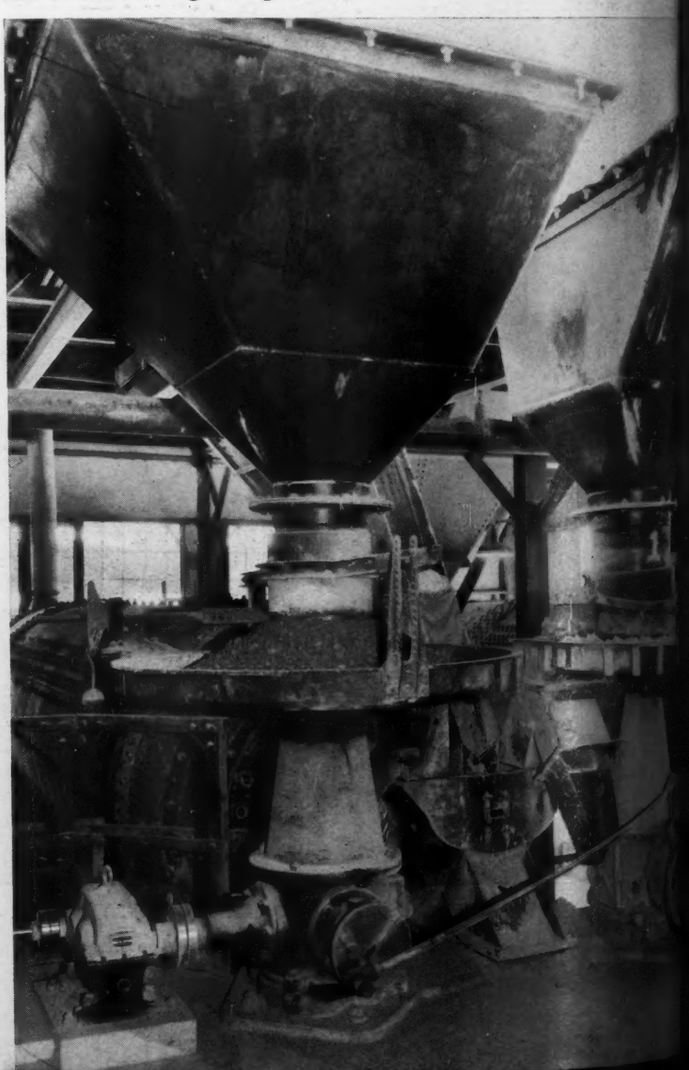
as filled and weighed, by gravity to motor-driven conveyors mounted on wheels, which are used for loading cars and trucks and for storing. The packers are equipped with Smidth dust collectors which discharge into the feed bins. Small Smidth Fluxo pumps return the spillage from the packers to the bins, A Modern Valve Bag Co. bag cleaner is located on the second floor and here returned bags are properly sorted, cleaned and repaired. The cleaner is equipped with a Sly dust arrester.

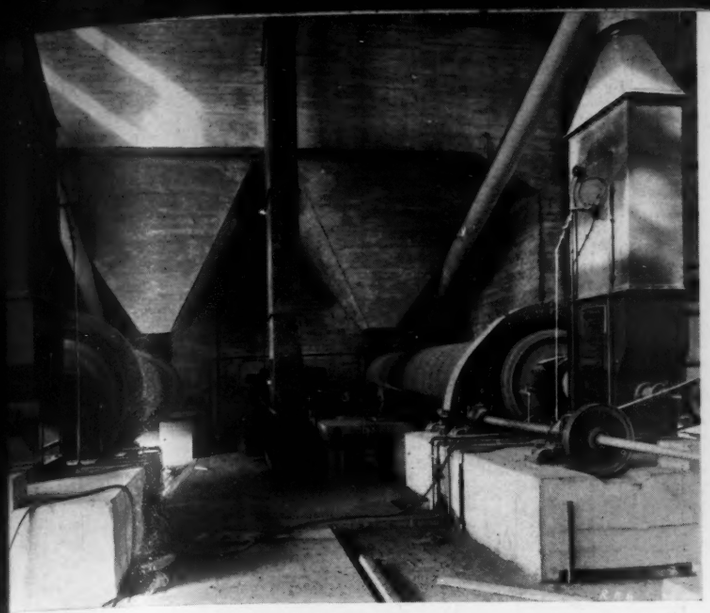
Personnel

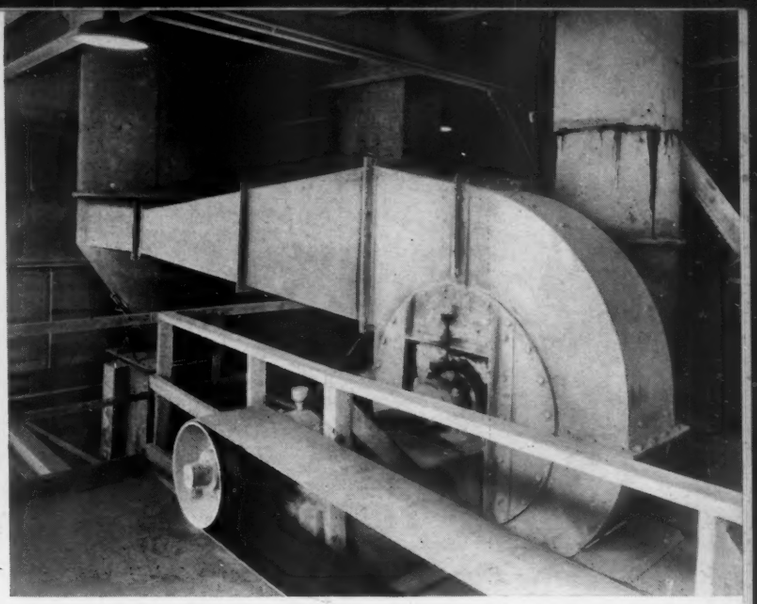
The M. A. Long Co., Baltimore, Md., had the contract for the construction of all the buildings and foundations and made the detailed drawings. Although ground was broken for the plant in late 1933, actual construction was not started until March, 1934. Credit for its early completion is to be given the M. A. Long Co. organization, F. L. Smidth & Co., the Westinghouse Electric & Manufacturing Co., the E. M. Gilbert

Below—Left: The 20-ton coal bins, under one of which is shown the double-screw feeders to the kiln. Right: Table feeders for clinker and gypsum on one of the finish grinding mills

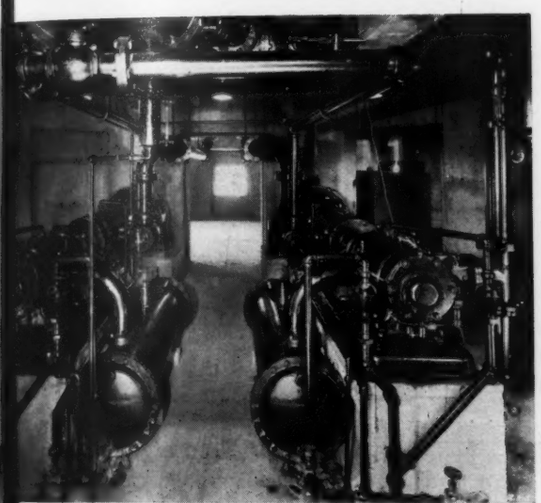






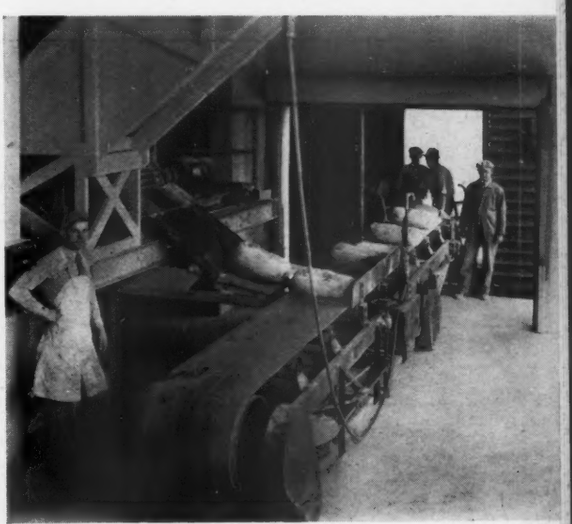


Left: The two combination coal drying and grinding mills. Right: Air separator working in closed circuit on one of the finish grinding mills



Left: Two rotary compressors furnishing air for slurry agitation and also for cement pump lines between mills and silos

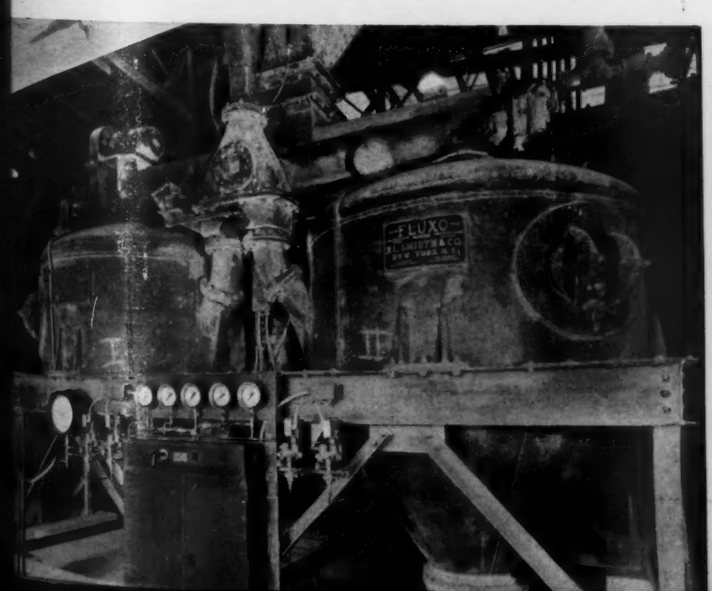
Right: Motor-driven portable conveyor for loading cars and trucks

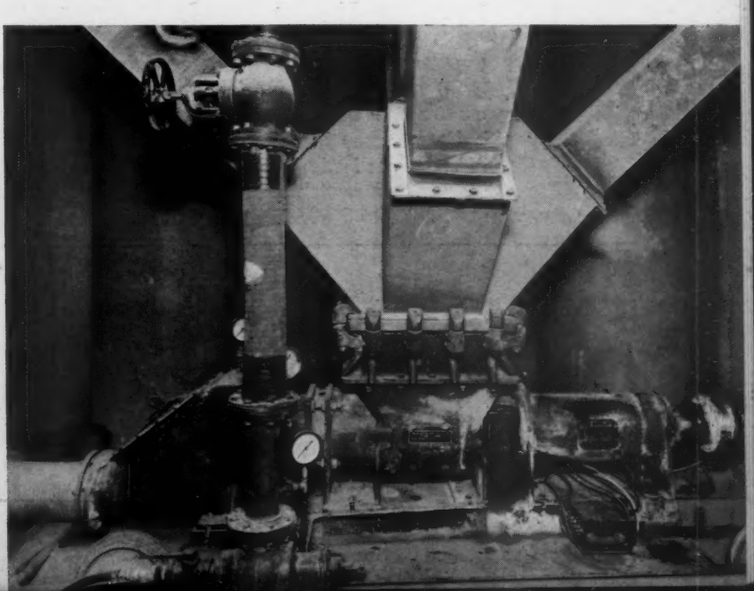


Engineering Corp. and the many equipment manufacturers.

In addition to the manufacturers mentioned, machinery and equipment for the plant were furnished by the Link-Belt Co. (steel inclosed chain-bucket elevators, screw-conveyors and certain drives); Merco-Nordstrom Valve Co. (valves); Worthington Pump & Machinery Co. (water pumps); Harbison-Walker Refractories Co. (fire-brick); Keasby & Mattison Co. (corrugated asbestos siding and roofing); H. H. Robertson Co. (metal roofing and siding), and the Blaw Knox Co. (steel floor and stair grating). (*Continued on following page.*)

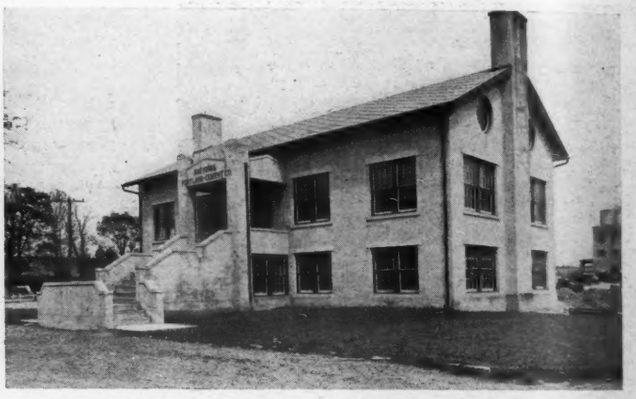
Below—Left: These pumps move cement from the finish mills to silos. Right: One of the three 7-in. cement pumps under the silos





Rear view of general storage building, silos and packhouse of the National Portland Cement Co.

The officials of the company are: W. M. Richardson, president; Fred B. Franks, vice-president and general manager; John D. Shibe, treasurer; George Richardson, secretary; H. J. Larkin, assistant vice-president and assistant general manager; T. Stig-Nielsen, director; G. Larsen, director; Thomas Cunningham, director; Joseph L. Scott, director; Stephen Williams, director and Arthur P. Hauser, director. A. P. Hachtmann is chief engineer; H. Hardvendel, superintendent, and Evan B. Guth, chief chemist.



Left: This photograph was taken at the time of starting the first kiln. Left to right: H. J. Larkin, Carl Grimmelman, George Richardson, Fred B. Franks, Fred B. Franks, Jr., T. Stig Nielsen and W. M. Richardson. Right: Plant office and laboratory; the first building completed

Salted Gravel Roads

INTERNATIONAL SALT CO. has been experimenting with rock salt as a binder and dust holder for gravel roads, used in the same manner as calcium chloride. Some 50 experimental stretches have been built in scattered sections, including New York, Michigan, Vermont, Maryland, Indiana, Louisiana, Mississippi, Ohio, Kansas and Peunsylvania. In Ontario similar projects are sponsored by Windsor Salt Co., Ltd.

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Much Local Stone Used?

NEARLY 10,000 samples of stone for highway construction were tested by the Pennsylvania Department of Highways laboratory in 1934, compared with 7756 in 1933. These test batches were taken from stone aggregating 4,000,000 to 5,000,000 tons.

Silicosis Suit Challenges Ohio's State Constitution

A SUIT challenging a part of article II, section 35, of the Ohio constitution, referring to the compensation laws, which denies the plaintiff the right to sue his employer for negligence causing the disease silicosis, was filed in federal court at Toledo July 23.

The suit, filed under the new federal declaratory judgment act permitting determination of the laws involved before the case is tried on facts, names Delpha Riffee, Marion, Ohio, administratrix of the estate of Hilton B. Riffee, as plaintiff. The Marion Steam Shovel Co. and John W. Bricker, attorney general, are defendants.

The petition asks permission to file a supplementary petition for $125,000 against the company. It is alleged that the death of Mr. Riffee was the result of silicosis, caused by inhalation of dust. The disease is not included in the 21 listed occupational types of diseases for which compensation can be received.

William L. Clay, Rochester, N. Y., who recently won a similar case in the New York court of appeals, is associate counsel, with Paul D. Smith and Dr. Thomas H. Sutherland, both of Marion, Ohio, attorneys for the plaintiff.

Lime

Statistics: Trade Relations Committee of the National Lime Association, which continues the statistical work of the former Code Authority, provides the following data:

TOTAL SHIPMENTS AND CAPACITY[1]

Month	Total capacity represented, short tons	Total shipments reported, short tons	Average value per ton	Ratio shipments to capacity, per cent — Lime manufacturing districts												
				United States	1	2	3	4	5B	6–8–9	7	10–11	12	13	14	15
1935—																
February	405,083	127,911	$7.21	31.6	13.8	25.5	43.8	37.8	32.2	23.1	43.0	39.8	24.0	14.4	35.6	17.0
March	401,439	166,350	7.51	41.4	21.7	52.6	53.9	47.9	40.8	24.9	50.7	46.4	27.3	16.3	39.5	24.5
April	394,765	176,983	7.75	44.8	31.2	62.4	68.0	50.1	42.6	33.7	43.5	44.1	36.5	20.7	37.0	18.4

[1]All data relate only to competitive lime. Total capacity under Table 1 includes the following capacity reported as idle: February, 10,311 tons; March, 8644 tons; April, 11,817 tons.

Rock Products News Briefs

Sand and Gravel

Worrall Bros., Louisville, Ky., is the new name of the former **West End Sand Service.** Recently extraordinary measures have been taken to recover as much as possible of the finest sizes of sand, which have a ready market locally for sand traps in golf courses. The sand from the screening plant goes first to two Link-Belt conical sand settling tanks (5 cu. yd. each) or dewaterers; the overflow of these go to a 5-cu. yd. Telsmith tank, and the overflow of this to a recently installed flume or settling tank 4x3 ft. by 40 ft. long. This long tank classifies the sand at various points along its length, progressively from coarse to fine. Bottom gates with wire controls leading to a central point permit an operator to open as many as desired to ground storage below. Thus most any classification can be obtained.

Flushing Sand and Gravel Co., Flushing, N. Y., has purchased the contracting business and equipment of Tuohy & Upton, Inc. Louis Traffano is president.

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Columbus Sand and Gravel Co., Columbus, Ga., has received a contract to supply gravel aggregate, in two sizes, and sand, for the lock and dam construction in connection with the improvement for navigation of the Savannah river from Savannah to Augusta. The company has established temporary headquarters in Augusta with R. D. Smith, president, in charge, and has built two new plants to supply the aggregates. The job calls for 43,000 cu. yd. of concrete, coarse aggregate for which is divided into two sizes, ½- to ¾-in., and ¾- to 1½-in. There is no local gravel over 1½-in. Sand is obtained from a small pit opened up 4 miles from the dam. It is equipped with a 6-in. Georgia Iron Works dredge pump driven by a Diesel engine. A flat gravity screen is the only device used to prepare it. It is conveyed by motor trucks to a ramp for loading railway cars. A gravel plant has been built at Kathwood, S. C., about 25 miles from the dam; it is not designed exclusively for this one job, but will continue in operation to supply highway aggregates. The deposit is 30 to 35 ft. deep with 1 to 2 ft. of overburden. An 8-in. Amsco pump, driven by a 130-hp. Caterpillar Diesel engine is mounted on a wood dredge hull. The dredge is also equipped with a 60-hp. Diesel to supply electric current for lighting and accessories. The generator is a Columbus Electric Manufacturing Co. 40 kv.a., 250 v., 97 amp. running at 1200 r.p.m. The pump discharges over a flat gravity type screen with 2½-in. openings. Below this screen is another with ⅜-in. openings. The gravel passing the first and retained on the second screen next goes to two screw or log washers, made locally, where clay balls are washed out. From the screw washers the gravel goes to a double-deck, Pioneer vibrating screen, 3x17 ft., where the two sizes are made. Six storage bins of 50 tons capacity each are provided. The screw washers are driven by a Leroy gasoline engine and the vibrating screen from electric power generated on the dredge.

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Arkhola Sand and Gravel Co., Ft. Smith, Ark., was unable to operate for about two weeks because of flood conditions.

Boston Sand and Gravel Co., Boston, Mass., had a scow which suffered a curious experience, according to a Salem newspaper. It was being towed from Greenbush to Cambridge when a bolt of lightning hit the radio antenna, followed it to the captain's cabin, smashed a stove to pieces, knocked the captain's dog Rags through a screen door and threw the captain against his bunk. No other damage was done.

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Bristol, Conn., has purchased 56 acres to be developed for a municipal sand and gravel supply—enough for the next 50 years, according to the superintendent of public works, Daniel Donovan. Already $22,170 has been spent on the property and for a gasoline-powered shovel.

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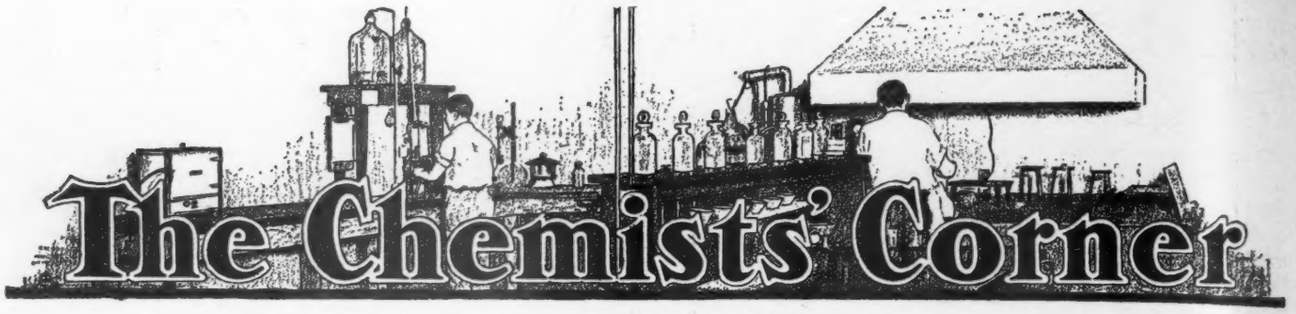
Missouri Portland Cement Co., St. Louis, Mo., is retiring from the sand and gravel and retail supply business and is placing on the market all its yards, including 11 parcels of land.

Worrall Bros.' very long sand-settling tank for recovery of fine sands

Atlantic Supply Co., Inc., Oxford, N. C., has taken over and is now operating the sand and gravel plant of the **Lawrence Sand and Gravel Co.** at Garysburg. L. R. Ames, former chief engineer of the North Carolina State Highway and Public Works Commission, is president; John C. Lawson, secretary-treasurer. Mr. Lawson was formerly with R. G. Lassiter Construction Co.

New gravel plant of Columbus Sand and Gravel Co.



Properties of Hydrated Lime*

By D. G. R. Bonnell

ALTHOUGH calcium hydroxide, in the form of slaked lime putty, has been used from very early times,[1] a review of the literature shows that the study of the relation between the properties of the hydroxide and its method of preparation has not attracted the attention of many investigators. It is a well-known fact that when calcium oxide (quicklime), obtained by calcining a practically pure limestone, is added slowly to a large volume of water, the hydroxide is formed as a flocculent precipitate. This precipitate, when the water content has been reduced to about 50%, forms a plastic mass, usually called a lime putty. On the other hand, when the hydroxide is prepared by using a small excess of water, the heat generated during hydration drives off the excess of water and the product is a dry fine powder. This dry powder—usually called a dry hydrate—when mixed with water will not form such a plastic putty as that obtained during the hydration with excess of water. This lack of plasticity imparts to the product a low workability and therefore it does not spread so easily under the plasterer's trowel.

Mathers and his co-workers[2] have carried out some investigations on the cause of the plasticity of lime putty. From their work on cataphoresis tests with lime suspensions Ray and Mathers[3] come to the general conclusion that many of the properties of hydrated lime can be explained by the assumption that it is a non-reversible colloid. The theory is developed that plastic limes owe their plastic properties to their power of forming charged particles on soaking or slaking. These charged particles hold around them a film of solution which so lubricates the particles as to make the lime putty plastic. Dawihl[4] comes to a somewhat similar conclusion from the results of microscopic measurements. He found that the hydroxides prepared with small excess of water, *i. e.*, the dry hydrates, contained a larger amount of coarse particles than the ones prepared in excess of water. These coarse particles were agglomerates of finer ones and were not broken up when the hydroxide was mixed with water. Dawihl concludes that when quicklime is slaked with excess of water the particles of hydroxide become coated with a film of water. The present investigation was carried out in an endeavor to obtain more information regarding the relation between the method of preparation and the properties of the hydroxide.

*From the *Journal of the Society of Chemical Industry* (Great Britain).

Editor's Note

WITH typical British thoroughness this investigator has set about to find out what gives hydrated lime the varying characteristics which most lime manufacturers (in the United States, at least) usually regard as inherent in their raw materials. His conclusions should be helpful to all manufacturers who are interested in making a hydrate for special purposes.

Preparation of Materials

Calcium oxide—For the preparation of calcium oxide—quicklime—a sample of pure carboniferous limestone from Buxton, the chemical analysis of which is given below, was crushed, sieved, and the fraction passing through the ⅜-in. and remaining on the ¼-in. sieve was selected. After thorough washing this fraction was placed in sillimanite pots in a controlled gas heated furnace and kept at 1100 deg. C. for 5 hours. After cooling to about 100 deg. it was transferred to earthenware jars and sealed until required.

ANALYSIS OF LIMESTONE USED

	%		%
CaO	55.35	Mn_3O_4	0.01
MgO	0.10	TiO_2	trace
SiO_2	0.48	NaKO	0.04
Al_2O_3	0.18	SO_3	0.02
Fe_2O_3	0.05	Loss on ignition	43.78

% $CaCO_3$ = 99.

The oxide prepared in this way was extremely active and reacted violently with water; *e. g.*, a particle ⅜ in. diameter completely hydrated in about 10 seconds.

Calcium hydroxide—In order to investigate the effect of different methods of hydration on the properties of the resulting hydroxide, samples of the oxide were hydrated in four different ways:

I. With excess of water at 100 *deg.*—The hydration of the oxide with excess of water was carried out in a special copper tank equipped with a fast rotating stirrer. Five litres of water were brought to the boil in the tank and 400 grams of oxide gradually and carefully added, the liquid being simultaneously violently stirred. After the oxide had been added the liquid was kept at the boiling point for an hour and then allowed to remain for 24 hours.[5]

II. With excess of water at 20 deg.—For this preparation, the same procedure as in I was adopted, except that in this case the temperature of the liquid was kept at 20 deg. throughout the experiment by simultaneous addition of ice with the oxide.

III. With slight excess of water—Three kilograms of the oxide were placed in a metal container and 2.25 litres (75% of the weight of oxide) of water added slowly while the solid mass was being stirred. During this operation dense clouds of water vapor were given off, and after cooling a dry mass of hydroxide was obtained. In the preparation of the hydroxide by this method, it was essential to add the water slowly, as otherwise the heat generated evaporated the water before complete hydration took place.

IV. By exposure to water vapor—In this case the calcium oxide was stored over distilled water in an autoclave, at ordinary room temperature, for about 14 days. At the end of this period analyses were made which showed that the oxide had been completely hydrated. Before the various samples thus prepared were investigated, they were passed through a No. 50 sieve, of aperture 0.254 mm. side, in order to remove the hard coarse particles. The residues on this

[1] A short historical account of the use of lime is given in Building Res. Board Special Report No. 9.
[2] *Ind. Eng. Chem.*, 1927, 19, 88; 1926, 20, 415, 475.
[3] *Ibid.*, 1928, 20, 475.
[4] Angew. Chem., 1933, 46, 461; *Tonind. Ztg.*, 1933, 57, 968, 988.
[5] Cowper and Williams, *J. S. C. I.*, 1928, 47, 31 T.

sieve for the various preparations are given below:

TABLE I

Preparation	Residue %
I	0.5
II	1.0
III	50.0
IV	30.0

Method of Investigation

The method adopted in this investigation was to determine, by sedimentation analyses, the distribution of particles of various sizes in the different preparations together with the sedimentation volume of a known weight of the hydroxide. Since lime is of great commercial importance and standard tests have been drawn up by various institutions, it was considered desirable to compare the results obtained in this investigation with those obtained by such practical standard tests.

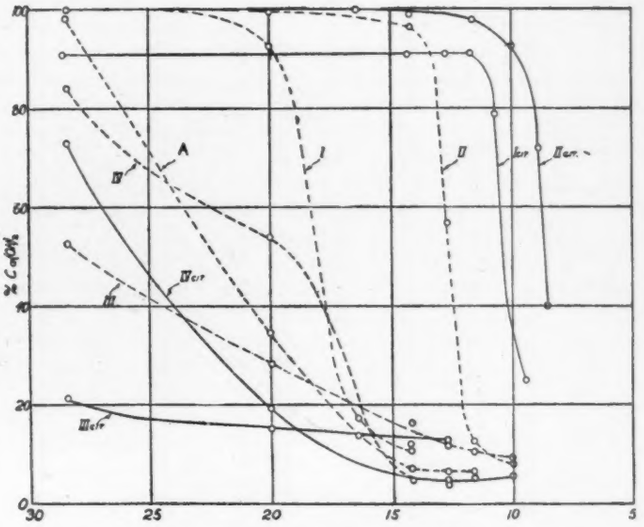
Procedure

Experience has shown that slaked lime undergoes a certain amount of ageing on storage in contact with water—in fact it was common practice in ancient times to age the lime in a covered pit for a number of years.[6] For the purpose of this investigation, the material used in each test was taken from stock suspensions of the sieved preparations—made with distilled water free from carbon dioxide—which had been allowed to soak for at least 7 days before any tests were carried out. It was considered that at the end of this time the rate of ageing of the lime would be small and the results obtained be comparable.

Sedimentation analyses—The sedimentation analyses were carried out on 1% suspensions. These were thoroughly shaken in sealed containers for 4 hours in a horizontal shaker of 3-in. stroke making 280 strokes per minute, and afterwards poured into the sedimentation tubes which were fitted with air-tight glass caps. In this way the exposure of the suspension to the action of atmospheric carbon dioxide was minimized. The caps were removed only for the short time necessary to extract the required volume in the sedimentation apparatus.[7] The extracted liquid was placed in a weighted crucible and the whole dried at 110 deg. *in vacuo*. In calculating the results, the density of the suspended hydroxide was assumed to be 2.18, while a correction was made for the dissolved material. For particle size between 0.254 mm. and 0.063 mm. the distribution was determined by means of standard sieves, as the time of sedimentation for these sizes is too short for the sedimentation method.

Sedimentation volume—This was taken as the apparent volume which the suspended hydroxide from 100 c.c. of 1% suspension occupied after settling for 24 hours.

Practical tests—The practical tests carried out in this investigation have been selected from the British Standard Institution Draft Specification No. 1949 for building limes.



Particle size in mm. × 10^{-3}

Fig. 1—Lime preparations dispersed with potassium citrate are marked "Cit."

Density of lime putty[8]—In this determination the lime is first mixed with sufficient water to give standard consistence when tested in the Southard viscosimeter[9] and the density is then obtained by determining the weight of a known volume of the putty. In general the putty density gives an indication of the plasticity of the putty, as the lower the putty density the higher the plasticity.

Workability—The workability of a material is the ease with which it can be worked by a craftsman. It has been found that in the case of plastering limes workability, to a great extent, depends on the water-retaining properties, *i. e.*, the adhesion between the lime and water, and also on the plasticity of the lime. The test for this workability is in principle a slump test. A known volume of putty of standard consistence is placed on a "flow table." This consists essentially of a horizontal smooth tabletop, which may be raised by a cam and then allowed to fall freely. The free fall—termed a bump—has a spreading effect on the specimen and the number of such bumps which are necessary to give a standard specimen, of 6.7 cm. diameter, a spread of 19 cm. is taken as an estimate of the workability.

RESULTS—TABLE II

Hydroxide preparation	Workability, No. of bumps	Putty density	Sedimentation volume in c.c.
I	121	1.220	8.5
II	270	1.203	10.5
III	15	1.413	3.5
IV	35	1.321	5.1
A	18	1.386	4.3

The high results shown for the particle size 0.0284 are due to the difficulty of determining the strength of the stock suspension with a high degree of accuracy and also to the possible slight carbonation during the sedimentation determinations. In the above tables, preparation A is a good commercial "dry hydrate" of about 99% $Ca(OH)_2$.

In the results reproduced in Table II, it will be observed that the higher the workability the higher is also the sedimentation volume and the lower the density. The hydroxides prepared with excess of water show a higher sedimentation volume than the others, while even in this method lowering the temperature of hydration, as in II, increases this volume.

The sedimentation results in Table III show that in preparations III, IV, and A there is a steady gradation of particles of various sizes from about 250 μ to 10 μ, whilst in samples I and II the particles present are more uniform in size. This is clearly seen from Fig. 1. In I and II the concentra-

TABLE III—SEDIMENTATION ANALYSES OF DIFFERENT LIMES

Particle size in mm.	% present in sample I	II	III	IV	A
<0.254>0.211	0.086	0.098	2.29	4.18	0.214
<0.211>0.104	1.13	1.954	23.4	18.57	1 026
<0.104>0.063	0.41	1.152	8.0	3.49	1.446
<0.0284	100	104	53.7	84.0	98.3
<0.0200	92.4	99.3	28.3	53.8	34.6
<0.0164	17.3	..	..	..	..
<0.0142	10.66	96.1	16.4	4.6	7.2
<0.0127	..	56.6	11.8	4.8	6.4
<0.0116	..	13.4	10.2	5.6	6.4
<0.0100	..	8.0	9.1	5.5	5.5

[6] Cf. Building Research Spec. Report No. 9, p. 30.
[7] *J.S.C.I.*, 1934, 53, 54 T.
[8] Cf. Cowper and Williams, *J.S.C.I.*, 1929, 48, 276 T.
[9] Amer. Soc. Test. Mat. Standards, 1924, p. 774.

tion of particles falls very steeply over a short range of particle size.

It would seem from these results that the main difference between the samples prepared by the various methods is simply one of particle size and particle-size distribution. In order to test whether the coarser samples would behave like I and II if their particle size was reduced and made more uniform, about 5 litres of 10% suspensions of III and IV were circulated through a colloid mill, with plates 0.005 in. apart, for about 30 minutes, and then examined, with the following results:

TABLE IV

Hydroxide sample	Workability	Putty density	Sedimentation volume
III	60	1.212	12.2
IV	52	1.252	10.2

The results show that III and IV after passing through the colloid mill resemble preparations I and II in sedimentation properties. The workability has also improved, the density decreased, and the sedimentation volumes have been considerably increased. In fact, a comparison of the sedimentation results with those of Tables II and III would lead one to expect a much higher workability and a lower density for these treated samples.

TABLE V—SEDIMENTATION ANALYSES AFTER PASSING THROUGH COLLOID MILL

Particle size in mm.	% present in sample I	III	IV
<0.0284	99.5	99.9	100.8
<0.0200	...	98.9	97.8
<0.0164	94.8	...	...
<0.0142	91.5	97.5	90.8
<0.0127	25.2	91.6	36.2
<0.0116	5.9	71.3	10.4
<0.0100	4.8	3.3	3.3

The effect of the mill treatment on the workability and density seems to show that particle size has a direct influence on these measurements. If this is really the case, then in view of their high workabilities, it would seem that I and II should possess a higher percentage of finer particles than the results of Table III indicate. This suggests that these hydroxides contain secondary particles which are loose agglomerates of smaller primary particles. The presence of such secondary particles would also tend to lower the sedimentation volume.

In view of these results, the possibility of breaking up these agglomerates by means of a peptiser was investigated. The best results were obtained with 0.6% potassium citrate solution. Chemical analyses showed that no calcium citrate was precipitated from solution when very low concentrations of the potassium salt were employed, but this was not the case with higher concentrations and even with 0.6% there was a slight precipitation of calcium citrate; consequently it was not thought advisable to work with higher concentrations than 0.6%.

These results bear out the indications observed in the data of Table V. It is clear by comparing Tables III and VI that the hydroxides I and II definitely contain secondary particles which are only loose aggregates of finer primary ones. Samples III and IV both before and after mill treatment, show no increased dispersion in the presence of potassium citrate; in fact, the former shows a slight coagulation. This means that the particles in these preparations are either comparatively large primary particles or, more probably, are aggregates of smaller ones so firmly held together as to behave in all these tests as primary particles. In view of these results, one is led to the conclusion that one important difference between the various hydroxide preparations is the degree of dispersion—when the calcium oxide is hydrated with excess of water it forms a more highly dispersed hydroxide than when a small excess is used.

When the oxide is hydrated with a small excess of water, the temperature generated in the mass is, as mentioned before, very high, and most of the water in contact with the hydroxide is driven off as steam. This intense heating during the process of hydration probably brings about the irreversible coagulation of the particles with the formation of stable complexes, together with an inactivation of the surface.

In the hydration with excess of water, on the other hand, the heat generated is dissipated into the liquid and the hydroxide surface is kept in contact with water, so that the activity of the particle surface is not decreased by any intense drying. Under these circumstances it is probable that the hydroxide particle becomes heavily hydrated with an envelope of water and that also the coagulation of the particles is greatly diminished.

Corroborative evidence on the effect of the temperature of hydration on the degree of dispersion is obtained from the preparations II and IV. In II, where the temperature was kept down to 20 degrees, the degree of dispersion is higher than in any other sample. With IV, which was prepared in water vapor, the rate of hydration was reduced, and thereby the rate of generation of heat. In this way the temperatures attained in the mass were lower than in III, with the result that the final preparation is more highly dispersed. Furthermore, if the highly dispersed samples I and II are dried at 100 degrees *in vacuo*, a hard mass is obtained which cannot be brought back to the initial dispersed state on soaking in water, *i.e.*, an irreversible coagulation of the hydroxide has taken place on drying.

It seems natural to conclude, therefore, that the differences in the properties of the hydroxides prepared by these methods is, to a great extent, caused by the relative amount of irreversible coagulation and surface deactivation brought about by the heat generated during the hydration.

It should be pointed out that all these experiments have been made with samples of calcium oxide which had been prepared by heating the carbonate at 1100 degrees. Furthermore, in this paper the ageing or maturing effect of long storage in water has not been considered, and it is possible that the differences for such matured samples may not be identical with those recorded in this investigation. It is hoped to report on such samples at a later date. Work on the effect of the temperature of ignition of the carbonate on the properties of the hydroxide is in progress.

TABLE VI—SEDIMENTATION ANALYSIS OF VARIOUSLY TREATED LIMES DISPERSED BY POTASSIUM CITRATE

Particle size in mm.	% present in sample I	II	III before mill treatment	III after mill treatment	IV before mill treatment	IV after mill treatment
<0.0284	..	..	21.4	..	72.9	101.4
<0.020	90.8	..	15.0	..	19.2	99.8
<0.0164	..	..	13.7	104.0	..	..
<0.0142	90.7	99.2	11.5	..	4.58	101.3
<0.0127	91.3	..	12.6	106.0	3.52	59.4
<0.0116	90.7	97.9	..	..	5.02	..
<0.0107	74.7	..	..	103.0	..	..
<0.010	..	92.5	..	..	5.66	..
<0.0094	25.1	..	..	51.3	..	..
<0.0089	..	72.0	..	23	..	..
<0.00855	..	39.9	..	..	..	..
<0.0025	1.8	..	2.0	..	..	..
Sedimentation volume	24.6 c.c.	26.4	4.0	15.0	8.0	14.5

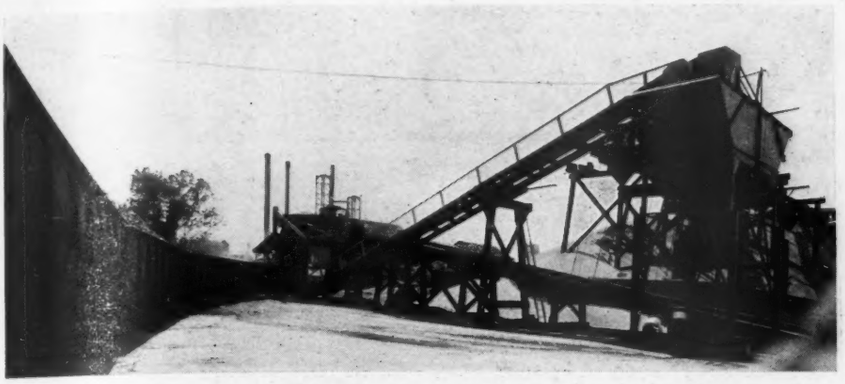
Summary

The relation between the properties of calcium hydroxide and the method of preparation from the oxide has been studied.

The results show that the physical properties of the hydroxide depend, to a great extent, on the procedure adopted in the hydration of the oxide. The probable factors which bring about these variations in physical properties are discussed.

The practical tests described in this paper were carried out in the Lime Section of the Building Research Station under the direction of Messrs. Cowper and Eldridge, and the author wishes to take this opportunity of thanking them for their help.

Rock Products News Briefs



New concrete aggregates batching plant of E. T. Slider Co., Louisville, Ky.

Sand and Gravel

Grand Coulee Dam, Wash.: For completion to its full proposed height of about 450 ft. and length of over 4300 ft., the great Grand Coulee dam, on the Columbia River, Washington, will require some 11,000,000 cu. yd. of concrete, it is estimated. Early in the fall preparations for concrete-placement operations covering the dam foundation will be well along. By then the more than a mile long conveyor system will have carried away the bulk of the 10,000,000 cu. yd. of dirt from the west bank abutment excavation. The 3000-ft. cofferdam on the river side of this hole is already in place. The contractor, Mason-Walsh-Atkinson-Kier Co., is now centering major attention on completion of the aggregate plant which promises to be the world's largest and most modern sand and gravel plant—with a feed-put of 2500 tons an hour and an output of 1000 tons an hour of thoroughly processed aggregate material. The balance, of 1500 tons an hour, will be wasted as material unsuited for use. All the processes from mining pit to aggregate plant to mix stations are tied together by belt conveyor units on centers totaling 21,300 lin. ft.—more than four miles of conveyors. These conveyors were furnished by The Jeffrey Manufacturing Co., Columbus, Ohio, whose engineers also designed the plant in consultation with H. L. Meyer, job manager, and C. D. Riddle, job engineer, of M. W. A. K. Co.

◈ ◈ ◈

Ohio River Sand Co., Louisville, Ky., has recently added a Blaw-Knox automatic batcher to its facilities, particularly for proportioning highway concrete materials. The structure is all steel, 54 ft. high to the head of the elevator. Trucks are used to bring the sand and gravel from the storage bins. These dump into a 10-cu. yd. steel hopper, in the shape of an inverted truncated pyramid 10 ft. 8 in. in plan by 5 ft. deep. The top of the hopper is flush with ground level. A Telsmith elevator, 70 ft. centers, carries the material to the top and discharges it to its particular bin compartment, which holds 50 tons (200 tons in four compartments). The elevator has a capacity of 160 tons per hour. The material is directed to its proper compartment by a revolving head, or chute. The batching is done by a Howe scale with automatic cut-off and push-button control. Corner post foundations are placed for the future erection of a cement-batching unit.

◈ ◈ ◈

E. T. Slider Co., Louisville, Ky., has recently installed a Butler automatic batcher for sand and gravel. The batcher is all-steel construction, of 100 tons capacity, divided into three compartments. Batching is done with a Starr balance indicator. The method of filling the batcher is unusual. A wooden ramp approximately 90 ft. long, inclined at a 15-deg. angle, parallels a 20-in. Link-Belt conveyor. Trucks are backed up this ramp to load railway cars direct, or by removing a couple of cross ties, the trucks dump to a hopper feeding the belt conveyor to the batching bins. The railroad tracks are on a curve, which necessitates a curve in the ramp, in order to approach the tracks perpendicularly.

New concrete aggregates batching plant of the Ohio River Sand Co. Louisville, Ky.

Another view of the Ohio River Sand Co. plant, showing barge unloading crane in the background

Hints and Helps for Superintendents

Simple, Small Rock Crushing and Screening Plant

By Ross Wheelton
Hamilton, Ont.

A HAMILTON, Ont., building supply dealer recently built a small crushing and screening plant, which is reduced to the barest essentials, yet supplies his needs satisfactorily. The same design might be used as an auxiliary to a larger operation for re-crushing or rescreening stock piles, or as a crushing auxiliary to handle over-size at a sand and gravel plant.

As the illustration shows, rock is dumped by truck from an elevated runway into a gyratory crusher. A short belt conveyor carries the crusher product to a 3-deck Niagara vibrating screen. The screen discharges to ground storage divided by wooden partitions into four quadrants. The screen is so placed that the fines drop vertically into one quadrant, the ⅜-in. is chuted to a second quadrant, the ¾-in. to a third, and the 1-in. to the fourth quadrant.

The board shield shown in the illustration is placed to prevent the wind from blowing the screenings into the other quadrants.

When the quadrant compartments are filled a small crane with a ½-yd. clamshell bucket is used to move the material over more ground space. The same crane, of course, is used for loading out the material.

Small crushing and screening plant of simple design

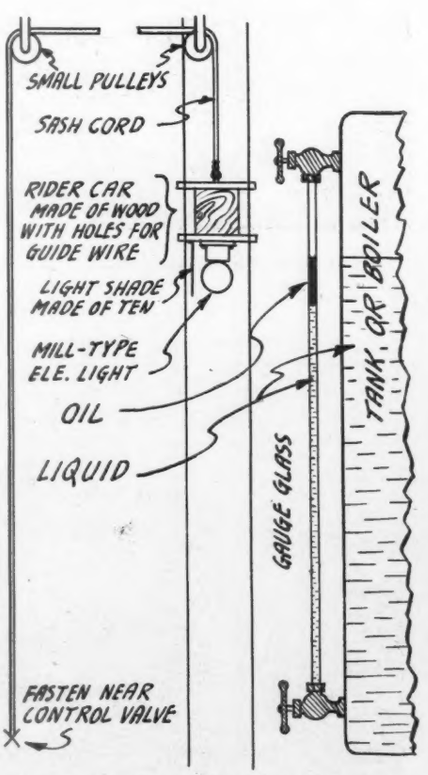
Increasing Visibility of All Types of Liquid Gauges

By Davis Rich II
Swanton Lime Works, Swanton, Vt.

IT IS FREQUENTLY difficult to read liquid gauges because of poor light, or because the observer cannot get in a position near enough to see the meniscus clearly. This often is true when control valves are located at some distance from the gauge, necessitating many footsteps before the liquid can be brought to the desired level.

This trouble can easily be remedied by adding a small amount of thin dark-colored oil after the liquid has come up in the gauge. If necessary a shaded electric light can be placed nearby, and where the gauge is a long one the light can be suspended from a counterbalanced sash-cord going over an awning pulley up above. Then the light can be moved up and down corresponding to the level in the gauge. An ideal lighting arrangement is shown in the drawing.

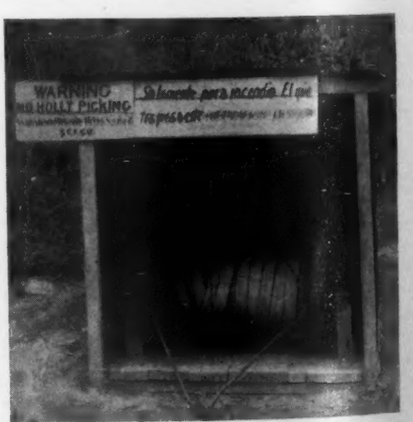
Of course, if the liquid is allowed to fall below the gauge the oil is lost, and new will have to be added. In the case of liquids under pressure, where the gauge feeds back at the top into the boiler or tank, it will be necessary to close the top and bottom petcocks, disconnect the top of the gauge-glass carefully, and squirt in the oil from an oil can.



Dark-colored oil and electric light aid in gauge reading

Plant Fire Protection

SOME FEW rock products plants have adequate home fire protection. Too many have none at all, and their fire insurance rates are accordingly high. A simple and inexpensive method is illustrated herewith. At one West Coast crushing operation, scattered about the plant and settlement in strategic places, are small hose houses containing a novel hose cart and a few lengths of fire hose. The hose cart was made in the company shops and is a simple reel mounted on a short shaft which also acts as the axle for the cart. Two Ford wheels (Model "T") with rubber tires are the novel features of the outfit. To remove the danger of "flats" due to long storage the entire apparatus is mounted on small blocks so that the weight is not on the tires, and yet so that a slight pull on the shaft will bring the cart off the blocking. The entire apparatus is small so that one man can pull it to the place of use even over the steep roads.



Hose house with novel fire hose cart

Pulley with piped circumference

Saves Cutting Belt

AT THE plant of the American Sand and Gravel Co., Hattiesburg, Miss., all gravel over ¾ in. is being crushed to make surfacing material for bituminous type roads.

The material passing through the gyratory crusher passes into a hopper of ½ cu. yd. capacity at ground level still in very wet condition. Here a bucket elevator with 30-ft. pulley centers is used to take the gravel up a 45-deg. angle to a screening plant.

A 10-in. rubber belt, running at the proper speed and equipped with sufficient buckets to keep this small hopper empty, is used. The company has had considerable difficulty with this sharp angular gravel becoming lodged between the lower 12-in. pulley and the belt. The gravel actually embedded itself into the rubber and cut holes through the belt, resulting in frequent clogging with shut-downs, and throwing the belt off the pulley. The life of a belt was very short, being only good for about 100 cars of material.

This condition has been improved considerably by bronze welding nine pieces of 1-in. black steel pipe 12 in. long at regular intervals around the circumference of the 12-in. pulley, perpendicular to the direction of travel of the belt, making a 14-in. pulley of it. These pipe have been crowned so as to raise the center of the belt to permit the run-off of water. Being 12 in. in length, they extend 1 in. beyond the pulley at each end, to permit gravel which has fallen between successive pipe to fall out clear of the belt. Occasionally a piece of gravel will become lodged between the belt and one of these pipe, but the experiment has been a success and has resulted in great prolongation of the life of the belt.

Fuse Torch

By Peter Comalli,
Superintendent, Lee Lime Corp., Lee, Mass.

I HAVE FOUND the following "Hint" very helpful and am passing it on to you for what you may think it worth:

Take a roll of sash cord and cut it in 1-ft. lengths; light the end and use it as a sort of torch to light fuse for setting off blasts; due to the fact that the stone is often very wet it is difficult to use matches, and with one of these torches you can light about one hundred holes.

Sash cord torch, to light fuses

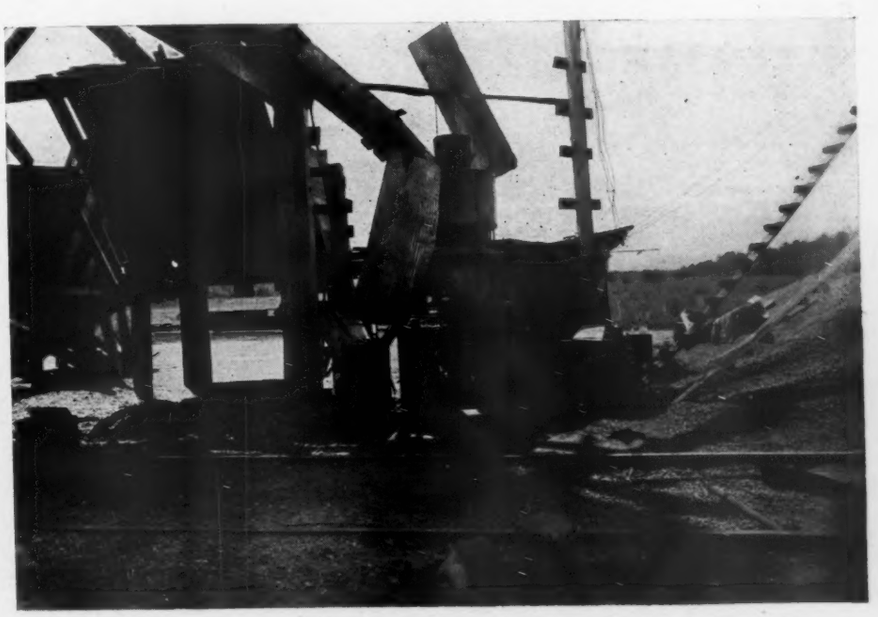
Frame for drying sand over stove

Simple Laboratory Sand Dryer

A SIMPLE DRYER for drying sand samples prior to screen testing can be made so as to utilize the heat that goes to waste in the foreman's office.

The one shown in the illustration is made of ½-in. rods, three for each shelf and so mounted as to rest over the heating stove. The lid of the stove is left off so that the bottom row of pans rests closely enough to the fire to dry the sand in a few moments.

The legs were made from scrap boards and covered with a layer of corrugated iron to make the whole fireproof.



Gyratory crusher and bucket elevator of American Sand and Gravel Co.

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Allentown P. C., com.[47]	7-22-35	4	5	
Allentown P. C., pfd.[47]	7-22-35	5½	7	
Alpha P. C., com.	7-22-35	17⅞ actual sale		$0.25 July 25
Amalgamated Phos. 6's, 1936[47]	7-22-35	103	105	
American Aggregates, com.[48]	7-16-35	¾	1¾	
American Aggregates, pfd.[48]	7-16-35	3	5	
American Aggregates, 6's 1st mtg. 3/6's, 1943, new bonds[48]	7-16-35	40	50	
American Aggregates, 6's, 1943, old bonds[48]	7-16-35	40	....	
American L. and S., 1st 7's[48]	7-16-35	100	....	
Arundel Corp., com.[48]	7-16-35	20	22	
Ashgrove L. & P. C., com.[49]	7-18-35	10	....	
Ashgrove L. & P. C., pfd.[49]	7-18-35	95	....	
Bessemer L. and C., Class A[47]	7-22-35	6	7	
Bessemer L. and C., 1st 6½'s, 1947[48]	7-16-35	42	46	
Bessemer L. and C., cert. of dep., 1947[46]	7-16-35	44	46	
Bloomington Limestone, 6's[47]	7-16-35	9	11	
Boston S. and G., new, com.[37]	7-16-35	1½	3	
Boston S. and G., new 7%, pfd.[37]	7-16-35	7	10	
Boston S. and G., 7's, 1939[37]	7-16-35	70	....	
Calaveras Cement, com.[40]	7-16-35	⅞	1⅛	
Calaveras Cement, 7% pfd.[40]	7-16-35	41	45	
California Art Tile, A[9]	7-13-35	1½	....	
California Art Tile, B[9]	7-13-35	...	3	
Canada Cement, com.[42]	7-23-35	6⅛	6¼	
Canada Cement, pfd.[42]	7-23-35	53	55	
Canada Cement, 5½'s, 1947[42]	7-23-35	104	104½	
Canada Crushed Stone, bonds[42]	7-23-35	95	...	
Canada Crushed Stone, com.[42]	7-23-35	5	nominal	
Certainteed Products, com.	7-22-35	5¼ actual sale		
Certainteed Products, pfd.	7-22-35	36 actual sale		
Certainteed Products, 5½'s, 1948	7-22-35	82½ actual sale		
Consol. Cement, 1st 6½'s 1941[47]	7-22-35	35	37	
Consol. Cement, pfd.[47]	7-22-35	3	4	
Consol. Oka S. and G. (Can.), 6½'s[42]	7-23-35	20	25	
Consol. S. and G., pfd.[42]	7-23-35	25	30	
Consol. Rock Products, com.[47]	7-22-35	½	1	
Consol. Rock Products, pfd.[47]	7-22-35	1	2	
Consol. Rock Products, units[47]	7-22-35	2	3	
Construction Mat., com.	6-12-35	6c actual sale†		
Construction Mat., pfd.	6-12-35	12c actual sale‡		
Consumers Rock & Gravel, 1st mtg. 6½'s, 1948[47]	7-22-35	20	25	
Coosa P. C., 1st 6's[47]	7-22-35	18	22	
Coplay Cement Mfg., pfd.[47]	7-22-35	11	15	
Coplay Cement Mfg., 6's, 1941[47]	7-22-35	76	79	
Cumberland P. C., 7's, 1937[47]	7-22-35	75	80	
Dewey P. C., com.[47]	7-22-35	35	40	
Dolese and Shepard	7-18-35	21	23	
Dufferin Pav. and Cr. Stone, com.[42]	7-23-35	2	3	
Dufferin Pav. and Cr. Stone, pfd.[42]	7-23-35	20	25	
Federal P. C., 6½'s, 1941[47]	7-22-35	20	25	
Fla. Port. Cement, 6½'s, 1937[46]	7-16-35	99	100	
Fla. Port. Cement, units[47]	7-22-35	23	26	
Giant P. C., com.[47]	7-22-35	3	5	
Giant P. C., pfd.[47]	7-22-35	11	13	
Gyp. Lime & Alabastine, Ltd.	7-22-35	5	actual sale	
Gyp. Lime & Alabastine, 5½'s, 1948[47]	7-22-35	90	93	
Hawkeye P. C., cap.[49]	7-18-35	29½	....	
Hercules Cement, com.[49]	7-18-35	19	....	
Hercules Cement, 7% pfd.[49]	7-18-35	75	....	
Hermitage Cement, com.[47]	7-22-35	12	15	
Hermitage Cement, pfd.[47]	7-22-35	70	75	
Ideal Cement, 5's, 1943[47]	7-22-35	102	103	
Ideal Cement, com.[47]	7-22-35	39	41	
Indiana Limestone 6's[47]	7-22-35	9	12	
International Cement bonds, 5's, 1948	7-22-35	103½ actual sale		
International Cement, com.	7-22-35	31½ actual sale		
Kelley Island L. and T.	7-22-35	14	15	
Ky. Cons. Stone, 6½'s, 1938[47]	7-22-35	18	21	
Ky. Cons. Stone, com.[47]	7-22-35	1	2	
Ky. Cons. Stone, pfd.[47]	7-22-35	2	3	
Ky. Cons. Stone, 1st mtg. 6½'s[46]	7-16-35	15	19	
Ky. Rock Asphalt, com.[46]	7-16-35	¼	¾	
Ky. Rock Asphalt, pfd.[46]	7-16-35	1½	2½	
Ky. Rock Asphalt, 6½'s, 1935[47]	7-22-35	25	30	
Lawrence P. C.	7- 5-35	18	20	
Lawrence P. C., 5½'s, 1942[47]	7-22-35	99	101	
Lehigh P. C., com.	7-19-35	14½	14⅝	
Lehigh P. C., 7% pfd.	7-19-35	100	101¼	
Louisville Cement[47]	7-22-35	80	85	
Lyman-Richey 1st 6's, 1935[47]	7-22-35	20	25	
Marbelite Corp., com. (cement pts.)[40]	7-16-35	¼	½	
Marbelite Corp., pfd.[40]	7-16-35	4	5¼	
Marblehead Lime, 6's, 1939[14]	7-16-35	50	55	
Marquette Cement, com.[47]	7-22-35	24	26	
Marquette Cement, pfd.[47]	7-22-35	95	100	
Marquette Cement Mfg. 1st 5's, 1936[47]	7-22-35	101	102	
Marquette Cement Mfg. 1st 6's, 1935[46]	7-16-35	100	101½	

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Material Service Corp.[47]	7-22-35	4	6	
McCrady-Rodgers, com.[47]	7-22-35	6	8	
McCrady-Rodgers, 7% pfd.[47]	7-22-35	30	35	
Medusa P. C., com.[47]	7-22-35	15	18	
Medusa P. C., pfd.[47]	7-22-35	45	50	
Michigan L. and C., com.[47]	7-22-35	55	60	
Missouri P. C.	7-19-35	7¼ actual sale		
Monarch Cement, com.[47]	7-22-35	75	80	
Monolith P. C., com.[9]	7-13-35	2	3	
Monolith P. C., 8% pfd.[9]	7-13-35	6	6½	
Monolith P. C., units[9]	7-13-35	14½	16½	
Monolith P. C., 1st mtg. 6's[9]	7-13-35	99½	101	
Monolith Portland, Midwest, pfd.[9]	7-13-35	1¼	2	
National Cement (Can.) 1st 7's[42]	7-23-35	102	....	
National Gypsum A., com.[47]	7-22-35	16	17	
National Gypsum, pfd.[47]	7-22-35	100	103	1.50 Aug. 15
National Gypsum, 6's[47]	7-22-35	105	106	
National L. and S., 6½'s, 1941[47]	7-22-35	98	101	
Nazareth Cement, com.[47]	7-22-35	5	7	
Nazareth Cement, pfd.[47]	7-22-35	45	50	
Newaygo P. C., 7% cum. pfd.[49]	7-18-35	25	....	
Newaygo P. C., 1st 6½'s, 1938[46]	7-16-35	97	99	
New England Lime 6's, 1935[14]	7-16-35	7	10	
N. Y. Trap Rock, 1st 6's, 1946	7-23-35	80½ actual sale		
N. Y. Trap Rock, 7% pfd.[46]	7-16-35	50	....	
North Amer. Cement, 1st 6½'s, 1953[47]	7-22-35	23	25	
North Amer. Cement, 6½'s, 1943[47]	7-22-35	90	91	
North Amer. Cement, 6½'s, 1940[47]	7-22-35	61	65	
North Amer. Cement, com.[47]	7-22-35	1	2	
North Amer. Cement, 7% pfd.[47]	7-22-35	3	5	
North Shore Mat. 1st 6's[47]	7-22-35	42	45	
Northwestern Port. Cem., units[9]	7-13-35	40	45	
Northwestern States P. C.[47]	7-22-35	16	20	
Ohio River S. and G., com.	7-22-35	1	....	
Ohio River S. and G., 1st pfd.	7-22-35	51½	....	
Ohio River S. and G., 2nd pfd.	7-22-35	5	10	
Ohio River S. and G., 6's[46]	7-16-35	11	13	
Oregon P. C., com.[47]	7-22-35	3	5	
Oregon P. C., pfd.[47]	7-22-35	65	70	
Pacific Coast Agg., new com.[40]	7-16-35	1¾	1⅞	
Pacific P. C., com.[40]	7-16-35	2½	3	
Pacific P. C., pfd.[40]	7-16-35	39	40	
Peerless Cement, com.[47]	7-22-35	½	1	
Peerless Cement, pfd.[47]	7-22-35	3	4	
Penn.-Dixie Cement, com.	7-22-35	4	actual sale	
Penn.-Dixie Cement, pfd.	7-19-35	23¼	actual sale	
Penn.-Dixie Cement, 6's A, 1941	7-19-35	89½	90	
Penn. Glass Sand Corp., pfd.[47]	7-22-35	107	108	1.75 (accum.) Aug. 1
Penn. Glass Sand Corp., 6's[47]	7-22-35	106	107	
Petoskey P. C., 6's, 1941[48]	7-16-35	94	....	
Petoskey P. C., 6's, 1935-38[48]	7-16-35	97	....	
Petoskey P. C., com.[48]	7-16-35	3½	....	
Republic P. C., 6's, 1943[47]	7-22-35	86	88	
Riverside Portland Cement, A[9]	7-13-35	7	8	.20 (accum.) Aug. 1§
Riverside Portland Cement, B[9]	7-13-35	¾	1¼	
Riverside Portland Cem., pfd.[9]	7-13-35	95	97	
Rockland and Rockport Lime, 1st pfd.[47]	7-22-35	2	3	
Sandusky Cement, 6½'s.	Called and paid			
Santa Cruz P. C., com.[9]	7-13-35	40	50	.50 July 1
Schumacher Wallboard, com.[9]	7-13-35	1½	2½	
Schumacher Wallboard, pfd.[9]	7-13-35	7	9	
Signal Mt. P. C., units[47]	7-22-35	35	38	
Southwestern P. C., units[40]	7-16-35	180	....	
Spokane P. C., units[49]	7-18-35	7½	....	
Standard Paving & Mat. (Can.), com.[42]	7-23-35	85c	90c	
Standard Pav. & Mat., pfd.[42]	7-23-35	10	14	
Superior P. C., A[40]	7-16-35	28	31	
Superior P. C., B[40]	7-16-35	5½	6½	
Trinity P. C., units[47]	7-22-35	18	21	
U. S. Gypsum, com.	7-22-35	60¾ actual sale		
U. S. Gypsum, pfd.	7-19-35	157 actual sale		
Volunteer P. C., 1st 7's, 1942[49]	7-18-35	90	....	
Volunteer P. C., com.[49]	7-18-35	1⅞	....	
Vulcanite P. C., com.[49]	7-18-35	....	6	
Vulcanite 7½'s, 1943[49]	7-18-35	55	....	
Wabash P. C.[47]	7-22-35	7	9	
Warner Co., ww. 1st 6's[47]	7-22-35	38	40	
Warner Co., com.[47]	7-22-35	1	2	
Warner Co., pfd.[47]	7-22-35	4	6	
Whitehall Cement Mfg., com.[47]	7-22-35	35	40	
Whitehall Cement Mfg., pfd.[47]	7-22-35	70	75	
Wisconsin L. & C., 1st 6's, 1940[47]	7-22-35	47	50	
Wolverine P. C., com.[47]	7-22-35	3	3½	
Yosemite P. C., A. com.[40]	7-16-35	1½	1¾	

Quotations by: [9]A. E. White Co., San Francisco, Calif. [14] The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [37]Wise, Hobbs & Seaver, Inc., Boston. [40]Martin Judge, Jr., and Co., San Francisco, Calif. [42]Nesbit, Thomson & Co., Toronto. [46]First National Bank of Chicago, Chicago, Ill. [47]Anderson Plotz and Co., Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [49]Feldman & Co., Inc., Boston, Mass.

† 60 shares sold at auction, at New York, N. Y.
‡100 shares sold at auction, at New York, N. Y.
§This will leave accruals of $4.28¾ per share.

Recent Dividends Announced

Idaho Portland Cement Co., 7% pfd. (semi-annual)	$3.50	July 15, 1935
National Gypsum, pfd. (accum.)	1.50	Aug. 15, 1935
Santa Cruz P. C.	.50	July 1, 1935
Riverside Cement Co., Class A (accum.)	.20	Aug. 1, 1935

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Alpha Portland Cement Co., Easton, Penn., reports for 12 months ended June 30 1935, subject to annual audit and year-end adjustments, show consolidated net loss of $256,247 after taxes, depreciation, depletion, minority interest, etc.

Current assets as of June 30, 1935, including $3,623,227 cash and marketable securities, amounted to $5,529,191 and current liabilities were $498,707. This compares with cash and marketable securities of $5,695,366, current assets of $8,014,317 and current liabilities of $348,988 on June 30, a year previous.

Consolidated income account for 12 months ended June 30, 1935:

	1935	1934
Net sales	$4,632,058	$4,545,291
Operating expenses	3,612,412	3,533,233
Depreciation and depletion	1,456,465	1,423,859
Operating loss	$ 436,819	$ 411,801
Other income	220,632	180,769
Loss	$ 216,187	$ 231,032
Charges	48,233	61,678
Minority interest	†8,173	†10,275
Net loss	$ 256,247	$ 282,435
Preferred dividends	58,334	140,000
Common dividends	483,450	.....
Deficit	$ 798,031	$ 422,435

†Loss applicable to minority interests.

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Lehigh Portland Cement Co., Allentown, Penn., reports for 12 months ended June 30, 1935, show net profit of $682,649 after taxes, depreciation, depletion and obsolescence, equal to $5.47 a share on 124,695 shares (par $100) of 7% preferred stock. This compares with $24,020 or 15c a share on 157,817 shares of 7% preferred stock for the 12 months ended June 30, 1934.

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Pennsylvania-Dixie Cement Corp., New York City, reports for 12 months ended June 30, 1935, show profit of $1,204,295 before depreciation, depletion and interest, comparing with profit of $568,524 for the 12 months ended June 30, 1934. After provisions for depreciation, depletion and interest, there was a net loss of $712,783 against net loss of $1,370,175 for the 12 months ended June 30, 1934.

Current assets as of June 30, 1935, amounted to $4,211,385 and current liabilities were $452,155 comparing with $4,583,637 and $442,999, respectively, on June 30, 1934.

Consolidated income account for 12 months ended June 30, 1935, compares:

	1935	1934
Gross profit	$1,204,295	$ 568,524
Depreciation and depletion	1,364,388	1,366,175
Loss	$ 160,093	$ 797,651
Interest	552,690	572,524
Net loss	$ 712,783	$1,370,175

National Gypsum Co., Buffalo, N. Y., reports for the six months ended June 30, 1935, net income of $296,046 after taxes, interest, depreciation, etc., equal, after provision for preferred dividends, to $1.58 a share on 130,463 shares of class A stock outstanding. This compares with $184,330 or 72c a share on the same basis in the first half of 1934.

Balance sheet as of June 30, last, shows current assets of $1,855,905 and current liabilities of $334,524, compared with $1,482,576 and $257,579, respectively, on June 30, 1934.

Regarding the proposed acquisition of Universal Gypsum and Lime Co. by National Gypsum Co., M. H. Baker, president, in a letter accompanying the financial statements said:

"If this proposal becomes effective it will supply increased manufacturing facilities in the east where we greatly need them and representation in the northwestern and southern markets in which at present we have no plants. In addition to its manufacturing units, Universal will also bring to National a substantial volume of business in gypsum, lime and metal lath which when combined with our sales under one organization should result in greater income for the stockholders of both companies."

"Present indications point to a gradual improvement in building and for that reason the outlook for our business is encouraging," he concluded.

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Ideal Cement Co., Denver, Colo., reports for years ended December 31:

	1934	1933
Cement sales	$5,227,757.80	$3,596,067
Net earnings from operations, after depreciation and Federal income taxes	1,086,249.14	138,833
Miscellaneous earnings, aside from cement manufacture	181,905.53	218,498
Total earnings	$1,268,154.67	$357,331
Less interest paid on debentures	155,142.54	207,300
Balance net earnings available for surplus and common stock dividends	$1,113,012.13	$150,031
Times interest earned	8.17	1.72
Earned per share (458,271 shares)	$2.429	0.327

BALANCE SHEET ITEMS

	1934	1933
Cash and securities	$7,139,645.26	$7,046,284
Total current assets	9,420,001.50	9,416,217
Current liabilities	514,659.16	201,266
Total assets	24,742,466.42	25,230,756
Bonds outstanding (5% Debentures)	2,886,300.00	4,146,000
Capital stock outstanding (shares)	458,271	458,271
Book value	$45.78	$45.40

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Material Service Corp., Chicago, Ill., (sand, gravel, crushed stone), reports for year ended December 31, 1934, profit of $49,190 after interest, depreciation and depletion, but before federal taxes, on net sales of $5,205,063. In preceding year, company reported net profit of $86,527 after charges and federal taxes, equal to 71c a share (par $10) of capital stock.

International Cement Corp., New York City, for the quarter ended March 31, reports:

	1935	1934
Net sales	$2,784,947	$2,852,617
Manufacturing cost, including depreciation	1,705,095	1,813,236
Shipping, selling and administration expenses	617,602	630,919
Operating profit	462,249	408,461
Interest charges, etc	221,229	217,130
Reserve, income taxes, etc.	125,419	141,435
Net profit	115,602	49,896

Note: The Argentine, Brazil and Uruguay companies are figured at average free market exchange rates except the Brazilian company's results for 1934, which were figured at 80% of average official exchange rates

Earnings per share for the first quarter, 1935, $0.18; 1934, $0.08.

For the years ended December 31, the company reported:

	1934	1933
Net sales	$13,648,881	$10,852,081
Manufacturing cost	6,092,189	4,771,760
Shipping, selling and administration expenses	2,580,587	2,224,723
Depreciation and depletion	2,814,335	2,764,106
Operating profit	2,161,770	1,091,492
Other income	169,388	126,192
Total income	2.331,158	1,217,684
Interest and discount	979,434	991,701
Federal taxes, etc	398,303	139,405
Miscellaneous charges	286,690	188,845
Net income	666,730	(d)102,266
Common dividends	156,570	.....
Subsidiary dividends	39	.....
Surplus for year	510,121	(d)102,266
Previous earned surplus	10,373,703	10,935,509
Surplus credits	169,831	.....
Surplus debits	298,247	459,539
Earned surplus, Dec. 31	10,755,409	10,373,703
Times charges earned	2.38	1.23

Balance sheet as of December 31, 1934, showed current assets of $12,990,308 and current liabilities of $1,279,528. Current assets included $6,775,450 in cash.

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Consolidated Rock Products Co., Los Angeles, Calif., on May 25 filed petition in the United States District Court to reorganize under section 77-B of the national bankruptcy act. Petitions of Union Rock Co. and Consumers Rock & Gravel Co. wholly owned subsidiaries were filed immediately afterwards.

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Signal Mountain Portland Cement Co., Chattanooga, Tenn., reports for the year ended December 31, 1934:

Net sales	$734,801
*Net income	114,792
†Earned per share, common	(d)$2.27

No. of common shares, 29,984.
*After depreciation, Federal income tax, etc.
†Disregarding preferred dividend arrears.

Preferred dividends in arrears as of May 15, 1935, amounted to $54 per share.

Current assets as of December 31, 1934, were $756,319; current liabilities, $53,705. Working capital was $702,614, as compared with $558,028 on December 31, 1933.

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Pennsylvania Glass Sand Corp., Lewiston, Penn.: Riter & Co., members of the New York Stock Exchange, are making public offering of 50,000 shares of voting trust certificates for common stock, the present offering price being $11.50 a share. It is the intention of the corporation, it is stated, to apply for listing of the voting trust certificates and the preferred stock of the corporation on the New York Stock Exchange when distribution of the certificates shall be sufficiently wide.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of July 20:

New England

36154. To establish the following storage charges on **foundry sand,** in bags, stored on piers at Boston (Hoosac Wharves, and Mystic Wharf), Mass. For first month or part thereof, $1.50; for each succeeding month or part thereof, 50c per net ton.

36171. **Limestone,** broken or crushed, in bulk, in open top cars, carload, (See Note 3), but not less than 80,000 lb., from Lee and West Stockbridge, Mass. Proposed rates per net ton: To Worcester, Mass., 170c; Auburn, Mass., 170c; North Oxford, Mass., 170c.

Trunk

33532 (Sup. 2). Amend as follows: **Lime,** C. L., minimum weight 50,000 lb., and **pulverized limestone,** C. L., minimum weight 50,000 lb., from Swatara, Chester Valley group, Knickerbocker, Howellville, Rambo, Plymouth Meeting, Blue Bell, Devault, Swedesford Road, Penn., Billmyer group, Union Stone Co., Bainbridge, Billmyer, Rheems, Penn., Bellefonte group, Bellefonte, Pleasant Gap, Chemical (B. C. R. R.), Penn., and York group, York stations, Campbell, Hellam, Thomasville and Bittinger, Penn., to Cornwall, Ont., 29c per 100 lb.

Sup. 2 to 33572. **Crude fluxing limestone,** C. L. (See Note 2), from Williams and Blue Bell, Penn., to Weatherly, Penn., $1.50 per gross ton, subject to emergency charge.

33653 (Sup. 1). Amend by changing commodity description from M. & P. R. R. stations, Cardiff, Md., Delta, Slate Hill, Penn., and Whiteford, Md., to Stratford, Conn., now reading roofing granules, to read "crushed or ground slate, C. L., minimum weight 60,000 lb."

33743. **Ground limestone,** carload, minimum weight 60,000 lb., from Rambo, Swedeland, Plymouth Meeting, York, Williams, Exton and Swatara, Penn., to Stratford and Kingston, Ont., 25c per 100 lb. subject to emergency charge. Proposed rate is comparable with rate to Kitchener, Ont.

33778. To cancel the commodity rates on **limestone, sand and gravel, crushed stone, fire stone,** from stations on the P. R. R. and other lines shown in P. R. R. Tariff I. C. C. 1399 to Quebec Central R. R. stations, classification basis to apply.

33813. Establish the same rates from Feura Bush, N. Y., as are now in effect from South Bethlehem, N. Y., on **stone, natural** (other than bituminous asphalt rock), crushed, coated with oil, tar or asphaltum, C. L. (See Note 2), to points on the following roads: B. & A. R. R., B. & M. R. R., N. Y. N. H. & H. R. R., Rutland R. R., C. Vt. Ry., D. & H. R. R., N. Y. O. & W. Ry., Erie R. R., D. L. & W. R. R., L. & H. R. Ry., L. & N. E. R. R., L. V. R. R., D. & N. R. R., N. Y. C. R. R., W. S. R. R., G. & J. R. R. Subject to emergency charge.

Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity as shipped, the shipper to so certify on shipping orders and bills of lading.

33819. **Roasted dolomite** (refractory dolomite in granular form, treated or untreated, clinkered and/or burned to a dead state), carload, **roasted calcite,** in granular form, treated or coated, clinkered and/or burned to a dead state, carload, (See Note 2), from Millville and (*) Martinsburg, W. Va., to Lima, O., $2.55 per net ton, subject to emergency charge. (*) From Martinsburg, W. Va., rate will apply on roasted calcite only. Reason: Proposed rate is comparable with rates to Detroit, Mich., Cincinnati, Middletown, O., etc.

33832. **Stone (fluxing),** C. L., (See Note 2), from McAfee and Lime Crest, N. J., to Bethlehem, Penn., 84c per gross ton, subject to emergency charge.

33835. **Stone, crushed,** coated with tar, oil or asphaltum, in bulk, in open top equipment, C. L., (See Note 2), from Bound Brook, N. J., to L. & H. R. Ry. stations, Buttzville, Alphana, Milford, Franklin, Vernon, N. J., Warwick, Hamptonburgh, Maybrook, N. Y., and various, rates ranging from $1.33 to $1.63 per net ton, subject to emergency charge. Note—The tar, oil and/or asphaltum not to exceed 10% by weight of the commodity as shipped, shipper to so certify on shipping orders and bills of lading.

Central

43379. To establish on **gravel and sand,** except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica, C. L., from Hugo, O. (N. Y. C. R. R.), and Earlville, O. (P. R. R.), to Youngstown, O., 80c per net ton. Route—Via N. Y. C. R. R. direct from Hugo, O., and P. R. R. direct from Earlville, O.

43380. To establish on **sand,** except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding and silica, and **gravel,** in open top cars, C. L., to Lakeville and Big Prairie, O., from Dresden, O., 90c, and from Randles, O., 85c per net ton. Route—Via P. R. R. direct.

43382. To establish on **gravel,** C. L., minimum weight 75 net tons, from Akron, O., to Cincinnati, O., 130c per net ton applicable on Ohio intrastate traffic only.

43383. To establish on **slag,** granulated, or crude, C. L., minimum weight 80% of marked capacity of car, from Warren, O., to North Lime, 65c; Leetonia, 70c; Fairfield, O., 75c per net ton. Route—Via P. R. R., Youngstown, O., Y. & S. R. R.

43385. To establish on **sand** (except blast, core, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica) and gravel, in open top cars, C. L., from Negley, O. (P. L. & W. R. R.). (Rates in cents per net ton.) To representative points: East Palestine, O., 60; Salem, O., 65; Sebring, O., 75; Alliance, O., 80; Louisville, O., 85; Koppel, Penn., 80; Wampum, Penn., 90; Walford, Penn., 75; Lowellville, O., 80; Struthers, O., 75; Girard, O., 75; Niles, O., 80; Ravenna, O., 90; North Jackson, O., 85; Berlin Centre, O., 80; Pulaski, Penn., 90; West Middlesex, Penn., 100; Sharon, Penn.; 100; Beaver, Penn., 90; East Liverpool, O., 100; Bayard, O., 85; Yellow Creek, O., 100; Beaver Falls, Penn., 80; Rochester, Penn., 90; Pittsburgh, Penn., 100; Bridgeville, Penn., 110; Canonsburg, Penn., 110; Washington, Penn., 120. Route—Via P. L. & W. R. R.—New Gallilee, Penn.—P. R. R.

43396. To establish on **stone,** crushed, C. L., from Thrifton, O. To Point Pleasant, W. Va., to Lyon, Va., 150c; Buffalo, W. Va., to Poca, W. Va., 160c; Nitro, W. Va., to Dickinson, W. Va., 170c; Shrewsbury, W. Va., to Gauley Bridge, W. Va., 180c.

43397. To establish on **crushed stone,** in open top cars; **crushed stone screenings,** in open top cars; **sand,** except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing loam, moulding and silica, and gravel, in open top cars, C. L, from Kenneth, Ind., to Kokomo, Ind., 50c per net ton. Route—Via P. R. R. direct.

43447. To establish on **ground gypsum,** C. L., minimum weight 80,000 lb., from Alabaster and National City, Mich., to Three Rivers and White Pigeon, Mich., 14½c., to apply in addition to and alternate with present rates.

43455. To establish on (a) **limestone,** agricultural, unburnt, in bags, or in bulk, in box cars, minimum weight 60,000 lb., and (b) **crushed stone,** in open top cars, **crushed stone screenings,** in open top cars, and **agricultural limestone,** unburnt, in open top cars, C. L., from Ridgeville, Ind., to Saginaw, Mich.; (a) 175c and (b) 160c per net ton. Routes—Via P. R. R., Vicksburg, G. T.; via P. R. R., Howard City, P. M., and via P. R. R., Kalamazoo, M. C.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

43456. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, common, grinding or polishing, loam, moulding and silica), and **gravel,** in open top cars, C. L., from Indianapolis, Ind., to Mooresville, Ind., 40c per net ton. Route—Via P. R. R. direct.

43464. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam moulding or silica) and **gravel,** in open top equipment, carload, will apply, from Marion, O., to Richwood, O., 40c per net ton.

43473. To establish on **sand and gravel,** C. L., from New Albany, Ind., to Salem, Ind., 60c per net ton.

43475. To establish on **stone,** crushed (in bulk), and **crushed stone screenings** (in bulk), in open top cars, carload, from Spore, O., to Oak Harbor, O., 90; Kingsway, O., 85; Fremont, O., 85; Clyde, O., 80; Bellevue, O., 80; Monroeville, O., 85; Norwalk, O., 85; Hartland, O., 90; Spencer, O., 90; Lodi, O., 95; Creston, O., 95; Dalton, O., 100; Massillon, O., 105; Sonnenburg, O., 100; Harmon, O., 105; Bedford, O., 115; Canton, O., 115; Navarre, O., 105; Beach City, O., 105; Dundee, O., 115; Sugar Creek, O., 115; Baltic, O., 105; Chili, O., 115; Fresno, O., 105; Coshocton, O., 105; Zanesville, O., 105, being proposed rates in cents per net ton.

43476. To establish on **stone,** crushed (in bulk) and **crushed stone screenings** (in bulk), in open top cars, carload, (See Note 3), from Kenton, O., to Malta, O., 125c per net ton.

43504. To establish on **crushed stone** and **crushed stone screenings,** in bulk in open-top cars, carload, (See Note 3), from Scioto and White Sulphur, O., to Summit, O., 90c per net ton.

43527. To establish on **sand and gravel,** C. L., in open top cars, from Indianapolis, Ind., to Maxwell, Ind., 35c per net ton. Route—Via C. C. C. & St. L. Ry. direct.

43528. To establish on **sand** (except blast, core, engine, filter or furnace, foundry, glass, grinding or polishing loam, moulding or silica), and **gravel,** C. L., from Connersville, Ind., to Dunreith, Ind., 40c per net ton. Route—Via N. Y. C. & St. L. R. R. direct.

43529. To establish on **crushed stone and agricultural limestone,** in open top cars, C. L., from Huntington, Ind., to points in Michigan.

To (Rep. destinations in Michigan)	Prop. Rates	*Prop. Rates
White Pigeon	(1) 115	122 (1)
Kalamazoo	(1) 130	126 (1)
Kalamazoo	(2) 125	126 (5)
Kalamazoo	(3) 130	126 (2)
Plainwell	(1) 130	131 (1)
Plainwell	(2) 127	131 (2)
Grand Rapids	(1) 140	140 (1)
Grand Rapids	(2) 137	140 (8)
Benton Harbor	(4) 117	126 (4)
Benton Harbor	...	126 (8)
Vicksburg	(5) 125	126 (5)
Cassopolis	(3) 120	122 (3)
Cassopolis	(5) 115	122 (5)
Battle Creek	(5) 130	131 (3)
Battle Creek	...	131 (5)
Niles	(3) 115	122 (4)
Niles	(4) 110	...
Niles	(4) 110	...
Kirby	(6) 130	...
South Haven	(6) 135	135 (3)
South Haven	...	135 (8)
Holland	(6) 140	140 (8)
St. Joseph	(6) 125	...

*90 per cent of I. C. C. 2003 scale.

(1) Via C. & E. R. R., Bolivar, Ind., C. C. C. & St. L. Ry., Elkhart, Ind., and N. Y. C. R. R.

(2) Via C. & E. R. R., Decatur, Ind., and P. R. R.

(3) Via C. & E. R. R., Bolivar, Ind., C. C. C. & St. L. Ry., Niles, Mich., and M. C. R. R.

(4) Via C. & E. R. R., Bolivar, Ind., and C. C. C. & St. R. Ly.

(5) Via C. & E. R. R. (Erie System), Bolivar, Ind., C. C. C. & St. L. Ry., Granger, Ind., and G. T. Ry.

(6) Via C. & E. R. R. (Erie System), Bolivar, Ind., C. C. C. & St. L. Ry., Benton Harbor, Mich., and P. M. Ry.

(7) Via C. & E. R. R. (Erie System), Rochester, Ind., N. Y. C. & St. L. Ry., LaPorte, Ind., and P. M. Ry.

(8) Via C. & E. R. R., Wilders, Ind., C. I. & L., La Crosse, Ind., and P. M. Ry.

43477. To establish on **screenings, refuse limestone,** C. L. (See Note 1), except when car is loaded to full visible capacity actual weight will apply, from Hillsville and Walford, Penn., to Wampum and Crescentdale, Penn., rate of 30c per net ton. Route—Via P. R. R. and P. & L. E. R. R. direct.

43565. To establish on **stone,** crushed (in bulk), **crushed stone screenings** (in bulk), and **limestone,** unburned, agricultural (in

bulk, in open top cars), C. L. (See Note 3), from Spore, O. (rates in cents per net ton), to Greenwich, O., 80c; Nova, O., 85c; Sullivan, O., 90c; Homar, O., 90c; Lodi, O., 95c; Creston, O., 95c; Sterling, O., 100c; Rittman, O., 100c; Warwick, O., 100c; Clinton, O., 100c; Barberton, O., 105c; Akron, O., 105c. Route—Via N. Y. C. R. R., Fostoria, O., B. & O. R. R.

43570. To establish on **slag,** coated with oil, tar and/or asphaltum, in open top cars, C. L., from Canton, O., to points in the states of Ohio and Pennsylvania, rates as shown (rates in cents per 2000 lb.). To Adena, O., 103c; Ashland, O., 118c; Baden, Penn., 103c; Baltic, O., 83c; Belpre, O., 168c; Bellevue, Penn., 113c; Birds Run, O., 103c; Braceville, O., 103c; Carmona, Penn., 123c; Chagrin Falls, O., 93c; Chillicothe, O., 155c; Conesville, O., 103c; Creston, O., 93c; Delaware, O., 133c; Edison, O., 137c; Enon, Penn., 93c; Galion, O., 128c; Gambier, O., 103c; Glouster, O., 137c; Greenwich, O., 113c; Grosvenor, O., 146c; Huron, O., 123c; Logan, O., 146c; Magnolia, O., 83c; Nelsonville, O., 155c; Norwalk, O., 113c; New Straitsville, O., 155c; Pittsburgh Jct., O., 93c; Sherrodsville, O., 83c; Thornville, O., 137c; Toronto, O., 93c; Twinsburg, O., 83c; Vermilion, O., 118c; Walford, Penn., 103c; Warrenton, O., 113c; Willoughby, O., 118.

43571. To establish on **sand,** C. L., from Manistee and Muskegon, Mich., to destinations in Wisconsin, Minnesota and Iowa, rates as shown. Proposed rates in cents per ton of 2000 lb.:

To (representative points)	Open Cars	Closed Cars
Algoma, Wis.	145	180
Ashland, Wis.	270	270
Beaver Dam, Wis.	135	170
Berlin, Wis.	145	180
Burlington, Wis.	125	160
Fond du Lac, Wis.	135	170
Green Bay, Wis.	145	180
Kohler, Wis.	*125	*160
Madison, Wis.	135	170
Menasha, Wis.	145	180
Merrill, Wis.	215	220
Nekoosa, Wis.	185	200
Oshkosh, Wis.	135	170
Sheboygan, Wis.	125	160
Superior, Wis.	320	320
Waupaca, Wis.	170	190
Waupun, Wis.	135	170
West Bend, Wis.	115	150
Wisconsin Rapids, Wis.	185	200
Albert Lea, Wis.	270	270
Austin, Minn.	260	260
Duluth, Minn.	280	280
Faribault, Minn.	270	270
Minneapolis, Minn.	270	270
St. Cloud, Minn.	300	300
St. Paul, Minn.	270	270
Stillwater, Minn.	270	270
Winona, Minn.	230	230
Cedar Falls, Ia.	260	260
Cedar Rapids, Ia.	240	240
Waterloo, Ia.	260	260

*Same as Sheboygan.

43593. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding and silica) and **gravel,** in open top cars, C. L., from Richmond and Indianapolis, Ind., to Knightstown, Ind., 40c per net ton. Route—Via P. R. R. direct.

43604. To establish on **slag,** commercial, crushed (a product of iron and steel blast or open hearth furnaces), C. L., minimum weight 80% of marked capacity of car, from Canton, O., to Akron, O., 50c per net ton. Route—Via P. R. R. direct.

43630. To establish on **sand and gravel,** (See Note 2), except when car is loaded to full Noblesville, Ind., to Kokomo, Ind., 50c net ton.

43641. To establish on **sand** and **gravel,** in open top cars, Portsmouth, O., to Superior, O., 75c net ton.

43642. To establish on **crushed stone,** Greencastle, Ind., to Clay City, Ind., 75c net ton.

43639. (a) To revise rates on **limestone, crushed, ground or pulverized,** not burnt, and **limestone, agricultural, crushed, ground** or **pulverized,** not burnt, C. L., minimum weight 50,000 lb., from the Bedford-Bloomington district to points east of the Western Termini of Eastern Trunk Lines to be on basis of 60c of 6th class.

(b) To amend Item 4715-A of C. F. A. L. Tariff 130-W, publishing 60% of 6th class on **limestone, crushed, ground** or **pulverized,** not burnt, and **limestone, agricultural, crushed, ground or pulverized,** not burnt, C. L., minimum weight 50,000 lb., between points in C. F. A. territory; also from points in C. F. A. territory to points east of the Western Termini of Eastern Trunk Lines and Canada, by providing for the addition of "limestone, sawing dust or refuse" therein to apply only from Bedford and Oolitic, Ind.

Southern

S. F. A. Submittal 7877—To establish on **stone,** natural, viz., granite, marble, limestone, sandstone: Paving, curbing, flagging and bridge stone (See Note 1), C. L., minimum weight 50,000 lb., packing and bracing specifications as provided in Southern Classification to be applied interterritorially between points in S. F. A. territory, on the one hand, and points in official territory, including I. F. A. territory, on the other, (a) except between southern Virginia and North Carolina points in Docket 13494 groups 1 through 4, on the one hand, and points in Buffalo-Pittsburgh, Trunk Line and New England territories, on the other; 12½% of Docket 13494 first class rates and (b) between southern Virginia and North Carolina points in Docket 13494 groups 1 through 4, on the one hand, and points in Buffalo-Pittsburgh, Trunk Line and New England territories, on the other; 12½% of constructive first class rates published in Agent Curlett's Tariff I. C. C. A-358. Note 1—Rates on bridge stone will apply only on rough chipped bridge pier or bridge abutment granite or marble; and on rough chipped or rough sawed bridge pier or bridge abutment limestone.

Amdt. 2 to 8622. **Slag,** C. L., Birmingham, Bessemer, East Birmingham, Emsley, North Birmingham, Woodward, Thomas and Anniston, Ala., to Jacksonville, Fla. Amended to include Woodward and Anniston, Ala., as points of origin at same rate as suggested from Birmingham, Ala., etc., i.e., 170c per net ton (not to be subject to emergency charges).

8825. It is proposed to amend Agent Pope's Freight Tariff 172-B, I. C. C. No. 1856, to provide that **limestone poultry grits** and **limestone, ground or pulverized** may be shipped in mixed carloads, minimum weight 60,000 lb., from Dugan, Ky., to St. Louis, Mo., and East St. Louis, Ill., on basis of the carload rate on each commodity in the shipment, applied to the weight of each commodity; the deficit in minimum weight, if any, to be paid for at the rate applicable on the highest rated article in the mixture.

8888. **Sand,** C. L. From Ellerson, N. C., to Clinchmore, Marco, Sagamore and Fort Mountain, Tenn., it is proposed to establish rate of 165c per net ton on sand, C. L. (See Note 3). Proposed for the purpose of permitting shippers at Ellerson to meet competition of local sand.

8912. **Phosphate rock** (other than ground phosphate rock, slush and floats and soft phosphate), C. L., Florida mines to Pelham, Ga. In lieu of rate of 383c per gross ton, it is proposed to establish rate of 325c per gross ton, subject to present description and carload minimum weight, from Florida mines named in A. C. L. R. R. I. C. C. B2750, and S. A. L. Ry. I. C. C. A7658 to Pelham, Ga. Proposed for the purpose of meeting highway competition and the suggested rate is not to be subject to emergency charge.

8918. **Sand, gravel and stone,** carload, Cedar Bluff, Ky., to Crockett, Bruces, Kenton, Rutherford, Dyer, Trenton, Fruitland and Humboldt, Tenn. (M. & O. R. R. stations). It is proposed to revise rates to the column 2 scale in I. C. C. Docket No. 17517 prescribed for joint hauls.

8942. **Sand, gravel, crushed stone, slag, rubble stone, broken stone and chert,** C. L., between all stations on the N. S. R. R.; also between all stations on the N. S. R. R., on the one hand, and points in Southern territory, on the other. It is proposed to show the N. S. R. R. as a participating carrier in rates published in scales 3 and 4, page 443 of Agent Young's I. C. C. 1635.

8951. **Bituminous rock, crushed or ground,** C. L., Bowling Green, Big Clifty, Black Rock, Kosmosdale, Rockport and Summit, Ky., to Norfolk and Newport News, Va., for coastwise movement to inland waterway destinations in North Carolina located on the Albemarle, Currituck and Pamlico Sounds. It is proposed to establish a rate of 325c per net ton, minimum weight 80,000 lb., except when for carriers' convenience car of less capacity is furnished, in which event marked capacity of car, but not less than actual weight will govern (in such instances bills of lading and waybills should carry certificate over agent's signature, "car of greater capacity not available"), but in no case less than 50,000 lb., the minimum weight to be charged for on each car when the actual amount loaded is less, from the above named origins to Norfolk and Newport News, Va. (for coastwise movement to inland waterway destinations in North Carolina located on the Albemarle Currituck and Pamlico Sounds). Does not include wharfage and handling charge, also not applicable to tipple side.

8976. **Slag** (except basic slag), granulated, lump or pulverized, C. L., Holt, Ala., to Fayette, Ala. It is proposed to establish a temporary rate of 95c per net ton in packages or in bulk, C. L., (See Note 3), said rate to apply only on Alabama intrastate traffic.

Western

C-41-87. **Stone,** crushed, ground or pulverized, C. L. (See Note 2), but not less than 40,000 lb., from Columbia, Mo., to destinations in Nebraska and Colorado. Rates: Proposed—Specific commodity rates, same as published from Hannibal, White Bear, Mo., and Quincy, Ill., in Item 6900, W. T. L. Tariff 18-N.

C-41-89. **Limestone,** agricultural (for land fertilization purposes only), (See Note 3), but not less than 40,000 lb., in open top cars or 54,000 lb. in cars other than open top or tank cars. Proposed—To add Columbia, Mo., on the M.-K.-T. R. R., as a point of origin in Item 500-B, Sup. 4, to W. T. L. Tariff 91-G.

D-25-27. **Cement, plaster, lime, limestone,** ground, **gypsum,** ground, **plaster retarder, plasterboard, wallboard, fibreboard, pulpboard, strawboard, feltboard** and **plasterboard putty,** in mixed carloads, minimum weight highest minimum weight applicable on any of above articles loaded in the mixed carload, from Portland, Boettcher and Wild's Spur, Colo., and Laramie, Wyo., to points in Western Trunk Line territory to which rates are now published. Proposed:

Commodity—Cement. Rate to apply—Cement rate.

Plaster. Rate to apply—Plaster rate.

Lime (building or ground)—Rate to apply—Cement rate.

Gypsum (ground). Rate to apply—Plaster rate.

Plaster retarder (not to exceed 100 lb.). Rate to apply—Plaster rate.

Board: plaster, wall (fibre, pulp, straw or felt). Rate to apply—Plasterboard rate.

Plasterboard putty (not to exceed 100 lb.). Rate to apply—Plasterboard rate.

New empty bags, for salvage purposes (not to exceed 25 lb. No charge.

Any two or more of the articles named may be shipped in mixed cars. Charges are to be determined by applying the carload rate to the actual weight of each commodity in the car, subject to the highest minimum weight on any article in the car; any deficit in the minimum weight to be charged for at the lowest rate of any article in the car.

D-41-82. **Limestone,** ground, C. L., (See Note 3), but in no case shall the minimum weight be less than 54,000 lb. From Alden, Ia., to stations in Missouri. Proposed—Southwestern Joint Line Scale shown in S. W. L. Tariff 162-I applied to short line distances. Examples: (In cents per ton of 2000 lb.): Chillicothe, 180; Kansas City, 200; Moberly, 180; St. Joseph, 180; West Quincy, 180; St. Louis, 215.

D-41-84. **Limestone,** crushed or ground, C. L., minimum weight as shown below, from Columbia, Mo., to Wyoming destinations shown below. Proposed:

To C & N.W. Pts.	Min. Wt. 60,000 lb.	Min. Wt. 90% of marked capacity of car
Van Tassel, Wyo.	26	23½
Douglas, Wyo.	26½	24
Casper, Wyo.	27½	25
Powder River, Wyo.	26½	26
Riverton, Wyo.	30	27
Lander, Wyo.	30½	27½
To C. B. & Q. Points		
Altavan, Wyo.	25½	23
Bordeaux, Wyo.	26½	24
Wendover, Wyo.	25½	23
Casper, Wyo.	27½	25
Thermopolis, Wyo.	30½	28
Torrington, Wyo.	25½	23
Worland, Wyo.	31	28½
Guernsey, Wyo.	25½	23
Gillette, Wyo.	28½	26
Sheridan, Wyo.	30½	28
Parkman, Wyo.	31	28½
To Union Pacific Points		
Yoder, Wyo.	25½	23
South Torrington, Wyo.	25½	23
Laramie, Wyo.	26½	24
Rock Springs, Wyo.	31½	29
Granger, Wyo.	33½	31

D-41-85. **Chatts** (mine gravel), whole or crushed, minimum weight per description in S. W. L. Tariff 162-I, Johanson's I. C. C. 2691, Kipp's I. C. C. A-2559, from Chitwood, Mo., Cave Spring, Mo., Galena, Kan., Pershing Spur or Crestline, Kan., Joplin, Mo., Miami, Okla., Central City Spur, Mo., Baxter Springs, Kan., Greece, Okla., Picher,

Okla., Waco, Mo., Bennett, Kan., Webb City, Carterville, Mo., John Jackson Switch, Mo., to destinations in Kansas. Proposed—Add 6c per ton of 2000 lb. to the rate determined by applying the scale in Item 800 S. W. L. Tariff No. 162–I, for the distance from Columbus, Kan., single or joint line, whichever is lower.

D–41–92. **Sand and gravel,** C. L., (See Note 3), from Ottumwa, Ia. (Rates in cents per net ton.)

To	Miles	Prop.
Coatesville, Mo.	44	80
Glenwood Jct., Mo.	49	80
Glenwood, Mo.	50	80
Julesburg, Mo.	55	85
Queen City, Mo.	59	85
Green Top, Mo.	64	90
Sublette, Mo.	67	90
Kirksville, Mo.	74	95

E–41–88. **Limestone,** ground or pulverized, in bulk or in barrels or sacks, C. L. (See Note 3), but in no case less than 54,000 lb. (same minimum and exceptions as per Item 60 of S. W. L. Tariff No. 162–I), from Quincy, Ill., to Bridge Junction, Ark. Proposed—$2.35 per ton of 2000 lb.

Southwestern

5821. Proposed issued suggesting rule permitting the commercial rates to apply on the net weight of **dolomite** when shipped in metal containers, and the free return transportation of such containers when returned as part of the equipment as originally loaded.

5834. It is proposed to establish rates on **lime (calcium), carbonate of,** carloads, minimum weight 40,000 lb., from Mosher and Ste. Genevieve, Mo., to Winona, Minn., of 29c, and also St. Paul and Minneapolis, Minn., of 30c per 100 lb.

5849. It is proposed to establish rate of 13½c per 100 lb. on **crushed stone** from Pilot Knob, Mo., and other points named in Item 1538 of S. W. L. Tariff 68–N, I. C. C. 2493, to Ottawa, Ill.

5854. **Chatts (mine gravel).** Establish rates, carload, from: Chitwood, Mo., Cave Springs, Mo., Galena, Kan., Pershing Spur or Crestline, Kan., Joplin, Mo., Miami, Okla., Central City Spur, Mo., Baxter Springs, Kan., Greece, Okla., Picher, Okla., Waco, Mo., Bennets, Kan., Webb City–Carterville, Mo., John Jackson Switch, Mo., to destinations in Kansas, based 6c per ton over the rate determined by applying the scale in S. W. L. Tariff 162–I.

5856. Establish rate of 93c per ton on **crushed rock** from Stringtown, Okla., to McKinney, Tex., to expire with December 31, 1935.

5857. Establish following proposed rates in cents per ton of 2000 lb. on **crushed stone** from Stringtown, Okla.: to Lone Oak, 80; Point, 84; Greenville, 77½.

5907. **Sand,** Guion, Ark., to Kansas City and Harrisonville, Mo. It is proposed to establish rate of 168c per ton of 2000 lb. on sand (except asbestos sand and silica sand), C. L., minimum weight as described in Item 60 of S. W. L. Tariff No. 162–I.

5922. **Crushed stone, sand and gravel,** Moline and Arkansas City, Kan., also Oklahoma points, to Alva, Okla. It is proposed to establish rate of $1.04 from Moline and 88c from Arkansas City per ton of 2000 lb.

5923. It is proposed to establish rates on **sand and gravel,** C. L., Arkansas City, Kan., to Oklahoma points on same percentage under standard scale as is now in effect from Moline, Kan., to same destinations, e.g., from Moline present rates to Woodward, $1.40; Medford, 98c; Buffalo, $1.36; Supply, $1.41. Proposed, from Arkansas City, $1.26, 73c, $1.28, $1.33, respectively.

5931. **Silica sand,** Guion, Ark., to Joplin, Mo. It is proposed to establish rate of 168c per ton of 2000 lb. on silica sand, in box cars, C. L., minimum weight as described in Item 60 of S. W. L. Tariff 162–I.

5935. **Sand,** Guion, Ark., to Oklahoma, Kansas, Arkansas and Missouri. It is proposed to establish on carload, minmium weight as provided in S. W. L. Tariff 162–I, the Everton, Ark., rate from Guion, Ark., to Muskogee, Tulsa and Bartlesville, Okla., Coffeyville and Pittsburg, Kan., Van Buren, Ark., and Joplin, Mo.

5960. It is proposed to establish on **agricultural limestone,** (See Note 2), from River Mines and Flat River, Mo., the same rates as applicable on **crushed stone** from Krause, Ill., to destinations in the states of Kentucky, Tennessee, Mississippi, Louisiana, Alabama and Arkansas, as named on pages 431 to 442, inclusive, of S. F. A. Tariff No. 388–A.

Illinois

7182. **Dolomite,** from E. St. Louis and Granite City, Ill., to Chicago, Joliet, Milwaukee. To carry the following application: Section (a) on dolomite transported in containers, carloads, rates, rules and regulations, including packing requirements, and minimum weights as regularly published, will be applied and charged for at the weight of the contents shipped in said container.

No charge will be made for the tare weight of the containers in which said freight is transported, subject to Sections (b) and (c) below.

No charge will be made for the returned empty containers in which said freight is transported when returned as part of the equipment as originally loaded.

Section (b). Containers as referred to in Section (a) must be furnished and loaded on railroad car by shipper and unloaded from railroad car by consignee at the expense of the consignee or consignor.

Section (c). All lifting or other devices necessary for the loading or unloading of said containers on or from carriers' gondola or coal car equipment must be furnished by the consignor or consignee.

8112. **Sand and gravel,** C. L., in open top cars, (See Note 3), from Patton, Ill., to C. C. C. & St. L. Ry. stations in Illinois: Proposed, net ton: to Schrodts, Ill., 65c; Calvin, Ill., 76c; Brownsville, Ill., 85c; Ledford, Ill., 88c; Tunnell, Ill., 95c; Forman, Ill., 95c.

Transcontinental

17311. **Natural stone,** mixed carloads, W. B.: Request for amendment of Items 5080, 5085 and 5090, Tariffs 1–P and 4–M, by including therein the following note: Mixed carloads of stone as described in Items 5080, 5085 and 5090, loose or in packages as provided for carload shipments in current Western Classification, will be assessed on basis of their respective carload rates and actual weight of stone of each description, subject to a minimum charge per car equal to the highest charge which would accrue on a minimum carload of stone of any one description included in the mixture.

Florida Phosphate Rock Line

REVERSING itself, the Commission, division 4, has decided that it will be better for the Live Oak, Perry & Gulf Railroad Co. to extend its line to serve a phosphate rock development at Cook's Hammock, Fla., than to have the May & Cook's Hammock build a new line to the rock.

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I. C. C. Decisions

19610. Crushed Stone. Switching rates in Chicago. By the Commission. Third supplemental report modifies prior reports to permit establishment for the period ending December 31, 1937, of a rate of 30c a ton, minimum 55 tons, on crushed stone from the quarries of the Consumers Co., Dolese & Shepard and Riverside Lime & Cement Co., near McCook, Ill., to the sewage treatment plant of the Sanitary District of Chicago at 39th St. and 52nd Ave., within the switching district.

22109. Sand. Rates on sand, gravel and crushed stone within the state of South Carolina. On petition of Seaboard Air Line. By the Commission. Second supplemental report further modifies previous findings to permit establishment of reduced intrastate rates from Dixiana to Columbia, S. C. Rate of 36c a net ton authorized for delivery on respondent's tracks at Columbia, with a 36c a net ton switching charge in addition on deliveries at tracks of lines other than the Seaboard. Commissioners McManamy and Porter dissented.

26260. Chat, crushed stone, and agricultural limestone. St. Joseph Lead Co. et al vs. B. & O. et al. By the Commission. Report by Commissioner Aitchison. Rates on chat from points in the Bonne Terre, Mo., district, on crushed stone from Marquette, Mo., and on agricultural limestone from Mosher, Mo., to destinations in southern Illinois found unreasonable and unduly prejudicial to the extent they exceed rates prescribed in appendix. Rates on these products to other southern Illinois destinations not unreasonable. Findings in 160 I.C.C. 507, 181, I.C.C. 373, and 188 I.C.C. 393 modified in part. Among the rates prescribed on chat from Bonne Terre are 113c to Collinsville, Ill.; 139c to Greenup, Casey and Marshall, Ill.; 152c to Farrington, Ill.; and 100c a net ton to Roots, Reily Lake and Chester, Ill.; on agricultural limestone from Mosher, Mo., 100c to Pinckneyville, Ill.; 112c to Flora, Ill.; and 120c to Olney, Ill. The new rates are to be effective not later than October 8.

26477. Dolomitic Limestone. American Agricultural Chemical Co. vs. N. Y. N. H. & H. By division 2. Dismissed. Rate applied on ground dolomitic limestone from Ashley Falls, Mass., to East Weymouth, Mass., prior to December 20, 1934, and on ground magnesium limestone, from Canaan, Conn., to East Weymouth in 1933, found not to have resulted in unreasonable charges.

I. and S. 3973. Cement. By the Commission. On reconsideration, reversed finding in original report 203 I. C. C. 443, which stated that the proposed rates on cement from El Paso, Texas, to destinations on the lines of the Southern Pacific in New Mexico had not been justified. Latest report considers the schedules justified. Proceedings discontinued. Commissioners McManamy, Aitchison and Lee dissented.

26587. Silica Sand. Burnham Boiler Corp. vs. Pennsylvania et al. By division 2. Rates on silica sand to Lancaster, Penn., from South Vineland and Manumuskin, N. J., found unreasonable to the extent they exceeded $1.60; reparation awarded. However, rates on molding sand from New Hamburg, South Schenectady and Stuyvesant, N. Y., to Lancaster not adjudged unreasonable.

26656. Sand. C. A. Wagner Construction Co. vs. C. & N. W. By division 3. Rate from Hawarden, Iowa, to Canistota, S. D., unreasonable to the extent it exceeded 60c a net ton on shipments made between August 26 and October 2, 1932. Reparation awarded.

26673. Talc. E. I. du Pont de Nemours & Co., Inc., vs. New York Central et al. By division 4. Rates in carloads from Emeryville, N. Y., to Chicago, Ill., Philadelphia, Penn., and Everett, Mass., adjudged unreasonable to the extent they exceeded 22.5% of corresponding first class rate, minimum 60,000 lb., on shipments between June 20, 1931, and October 19, 1933. Reparation awarded.

Proposed I. C. C. Decisions

26779. Core Sand. International Motor Co. vs. D. & H. et al. By Examiner Henry B. Armes. Rates on core sand and on a carload of moulding sand to New Brunswick, N. J., proposed to be found unreasonable to the extent they exceeded $1.80 from Elnora, N. Y., $2.95 from Davisville and East Greenwich, R. I., and $3.15 from Hill's Grove, R. I. Reparation proposed.

26826. Portland Cement. Universal Atlas Cement Co. vs. Wabash et al. By Examiner Horace W. Johnson. Rate from Hannibal (Ilasco Junction), Mo., to Evansville, Ind., for river movement beyond, proposed to be found unreasonable to the extent it exceeded 11c not subject to the emergency charge on 18 carloads shipped August 15, 1933. Reparation of $1033 proposed.

Lime Producers' Forum

Conducted by Victor J. Azbe,
Consulting Engineer, St. Louis, Mo.

Data on Heat and Temperature Requirements for Dissociation of High Magnesium Limestone

THERE SEEMS to be lacking a standard of comparison of efficiency for high magnesium lime as compared to high calcium lime. This is detrimental, because those burning high magnesium stone may think they are doing well by contrast with some high calcium lime plant, while actually they are doing rather poorly. A fuel ratio of four to one may be quite fair with high calcium stone, but a similar ratio and otherwise similar conditions with magnesium stone may be termed rather poor.

The reason is in part simple and in part involved. The magnesium portion requires less heat than the calcium portion and a lower temperature as well, and this latter is the reason why comparison is difficult; for the magnesium part of the stone to a great extent is calcined with heat unavailable for the calcium part; one may say that the magnesium calcining zone of the kiln acts like a waste-heat boiler on a rotary kiln. This heat in a high calcium kiln is doomed to be wasted.

Weight Proportions

High magnesium stones often have a carbonate ratio of 60% $CaCO_3$, 40% $MgCO_3$; and so these calculations will be based on such a stone. Warner Cedar Hollow stone is one specific example.

$CaCO_3$ = 56% CaO and 44% CO_2
$MgCO_3$ = 47.8% MgO and 52.2% CO_2

It will be noted that $MgCO_3$ has more than half of the CO_2, and $CaCO_3$ less than half; this in itself will give a much better gas analysis on a kiln calcining high magnesium stone, which at times is mistaken for better results.

The weights of lime and CO_2 from the two components of stone will be as follows:

Calcium portion

$$\frac{56}{100} \times 0.6 = 0.336 \text{ lb. CaO}$$

$$\frac{44}{100} \times 0.6 = 0.264 \text{ lb. } CO_2$$

Magnesium portion

$$\frac{40.3}{84.3} \times 0.4 = 0.191 \text{ lb. MgO}$$

$$\frac{44}{84.3} \times 0.4 = 0.209 \text{ lb. } CO_2$$

Summarizing the above we get per pound of high magnesium stone:

	Oxides		CO_2	
MgO...	0.191 lb.	36.3%	0.209 lb.	44.2%
CaO....	0.336 lb.	63.7%	0.264 lb.	55.8%
	0.527 lb.	100.0%	0.473 lb.	100.0%

Similarly per pound of high magnesium lime:

	Oxides	CO_2
MgO.....	0.363 lb.	0.396 lb.
CaO.....	0.637 lb.	0.502 lb.
	1.000 lb.	0.898 lb.

Heat Necessary for Dissociation

The heat necessary for dissociation per pound of carbonate depends upon the temperature of dissociation, and for calcium carbonate is 772.6 B.t.u. at 81 deg. F. and 679.5 B.t.u. at the temperature of dissociation of 1648 deg. F., corresponding to 100% CO_2 atmosphere, such as would exist within a lump of stone exuding gas at good rate.

Similarly for Magnesium Carbonate the heat necessary is 581 B.t.u. at 81 deg. F. and 536 B.t.u. at 1125 deg. F., which is the dissociation temperature of $MgCO_3$ in 100% CO_2 at a pressure of one atmosphere.

For high magnesium stone the corresponding figures would be 686 B.t.u. at 81 deg. F. and 617 at the temperature of dissociation. Tabulating this we get:

Per pound of stone	$CaCO_3$	*Dolomite*	$MgCO_3$
At 81 deg. F.....	772	686	581
At Diss. Temp....	679	617	536
Per pound of lime			
At 81 deg. F.....1378		1300	1215
At Diss. Temp....1210		1170	1070

While in some cases where overall kiln efficiency is to be determined, the 81 deg. F. base figure applies, in our present case we must take the heat at the temperature of dissociation in our kilns, which is 1648 deg. F. for $CaCO_3$, but by tests of Warner and Kelley Island stone only 1393 deg. F. for the magnesium portion. It requires 40 B.t.u. or 3.3% less heat for the magnesium stone, but that difference would hardly be noticeable in practical kiln operation. The fact, however, that the dissociation temperature is 255 deg. F. less is of great practical importance. This means that heat which becomes useless for making of high calcium lime, still is used for dissociation of the magnesium portion. Not only the products of combustion leaving the calcium hot zone at around 1650 deg. F. but the heat in the CO_2 from the calcium carbonate dissociation leaving this zone is also utilizable.

One pound of carbon has 14,600 B.t.u. of heat; it requires 11.51 lb. of air and consequently the products of combustion burned without excess air are 12.51 lb. of gas. But there is likely to be 20% of excess air, making the gas weight 14.81. Then there is the CO_2 from the calcium carbonate dissociation. We will assume that 4 lb. of CaO are made in the hot zone for every pound of carbon. This amount of lime results in 3.13 lb. of gas, so the total quantity of gas pouring from the calcium dissociation over into the magnesium dissociation zone is 17.94 lb. per pound of carbon.

However, we know that the range between dissociation temperatures of magnesium and calcium is too small to expect all of the magnesium that is accompanying the calcium to be decomposed with left-over heat from the high calcium zone. We may assume, however, for the present, that half is so decomposed and the other half enters the high calcium zone. In view of this 19.19 lb. of gas leaves the calcium zone containing 8250 B.t.u. of heat. In the magnesium zone a further 1.25 lb. of gas is added, so gas leaving the magnesium zone is 20.44 lb. with a heat content of 7120 B.t.u. The difference between 8250 and 7120 is 1130 B.t.u. Actual heat necessary is 1070 × 1.15 = 1230. There is not quite enough heat to make it, but there are other saving features too involved to be dealt with in the limited space we have available, which would, however, make it perfectly safe to say that:

The ratio with magnesium stones under conditions of equal operating efficiency should be 20% greater.

Publications Received

Specifications for Asphalt Road Construction: Nine pamphlets issued by The Asphalt Institute, 801 Second Ave., New York, N. Y., which will be sent upon request without charge. These pamphlets which are said to show in detail the best low-cost construction practices are as follows: (A-1) Asphalt macadam surface course; (A-2) Asphaltic concrete surface course; (A-3) Stone-filled sheet asphalt surface course; (A-4) Sheet asphalt binder and surface course; (B-7) Asphalt macadam base; (B-8) Asphaltic concrete base; (S-1) Asphalt surface treatment or retreatment of old bituminous surfaces; (RM-1) Asphaltic road-mix surface course (macadam aggregate); and (RM-2) Asphaltic road-mix surface course (dense graded aggregate).

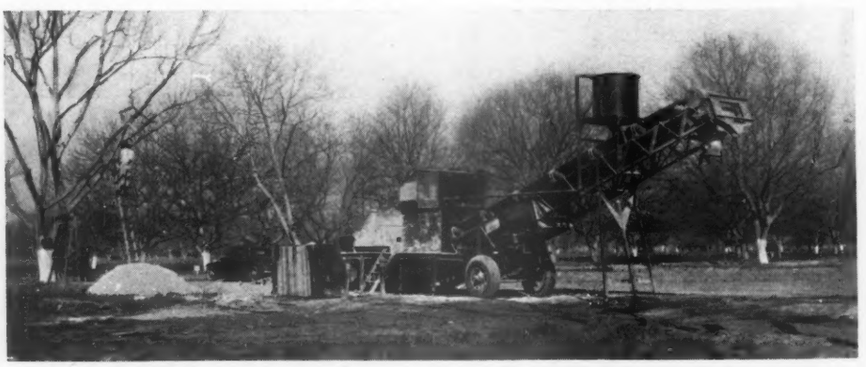
The 1934 Supplement to Book of A. S. T. M. Standards; by the American Society for Testing Materials, 260 S. Broad St., Philadelphia, Penn. This pamphlet comprises the first supplement to the 1933 book of A. S. T. M. standards and contains 49 standards adopted or revised by letter ballot of the society September 1, 1934.

Cement Products

Increasing Production From Transit Mixers

By Edmund Shaw,
Contributing Editor, Rock Products

VARIOUS SCHEMES have been worked out to cut down the "dead time" of transit concrete mixers, and some interesting home-made devices have been built for that purpose. But the Consolidated Rock Products Co., Los Angeles, Calif., when it needed such a machine coöperated with the Stephens-Adamson Manufacturing Co.'s branch in that city to produce a machine that could be standardized so as to adapt it to all conditions that it would be likely to meet in ordinary jobs.



Transfer machine that increases use of truck concrete mixers

The Rock Products company has a number of plants and several "bunkers" in and around the city from which it ships either aggregates or concrete in transit mixers to the jobs. It also has a large fleet of trucks arranged to transport batched aggregate. On jobs where there is a long haul from the nearest plant or bunker to the job it uses the transfer machine. The aggregates, batched, are brought from the plant to the machine, which is used to fill the transit mixers. In this way a great many batching trucks may be usefully employed for a rapid delivery of concrete to the job.

The batch trucks dump into the hopper of the transfer machine and then the cement is added from sacks. A platform around the top of the hopper holds sacks and is a place where men may stand while putting in the cement. The materials then go by a belt conveyor to a transit truck and water is added at the same time from a measuring tank. Power is from a gasoline engine.

The machine is on a regular trailer chassis and can be moved almost anywhere that a truck can go.

The illustration was taken when the machine was being used at one of the Federal housing propositions at El Monte, Calif. One hundred houses were being built, and each house took 21 cu. yd. of concrete, about four times what the ordinary small dwelling in Southern California contains, for frame construction, but in this case the floor, as well as the foundations, is of concrete.

Portland Cement Pavement Yardage

AWARDS of concrete pavement for June, 1935, were announced by the Portland Cement Association as follows:

	Sq. yd. awarded during June, 1935	Total sq. yd. for year to date, June 29, 1935
Roads	1,507,963	9,462,113
Streets	606,592	4,705,337
Alleys	14,025	59,910
	2,128,580	14,227,360

Cement Products

Wyoming Concrete Products Co., Casper, Wyo., incorporated for $50,000, has just completed its plant, and shipments are being made. H. P. Gutz is in charge of sales. It is said this is the 15th plant built by the same interests in the Northwest during the last six years. Products include pipe as well as building units.

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West Coast Dunbrik Co., St. Petersburg, Fla., began production in June. Charles C. Clarkson is president of the company. Other officers include Gust Blair, vice president; T. W. Clarkson, secretary; and W. D. Thompson, treasurer. The company owns the large building housing the plant which covers an area of 100x150 ft. It has a private railroad siding on the A. C. L. An automatic patented brick-making machine turns out a product which is proving popular with local builders and contractors. The brick is made in plain or colored form, with or without glazed face in various shades. The company's automatic machine has a capacity of approximately 2000 brick an hour. In addition to Dunbrik, the company manufactures Dunstone, which is double and triple the size of the other product.

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Green Bay Planing Mill Co., Green Bay, Wis., has erected at Haevers Corners on the Cedar Creek road a plant for the manufacture of concrete blocks. In the new plant all the necessary new equipment has been erected, tests made and a high quality product achieved. The plant will be equipped to include in its regular output concrete blocks for building purposes in various sizes and in plain face, panel face, smooth face and rock face finishes. The product will be used in basement construction, warehouses, garages and other building purposes. The plant will be a division of the Green Bay Planing Mill Co. In announcing that the new plant was well on its way and in production, O. W. Brightman, president of the company, said: "The increase in residence construction and the confidence that this now will continue quite uninterrupted made it seem wise to our company that we add to our already extensive lines of building materials, concrete blocks of our own manufacture. Our patrons can be assured that these blocks will be of a high quality which this company will at all times back up and be proud to call its own."

Central Concrete Mixing Corp., Brooklyn, N. Y., in an open letter to the cement industry, seriously objects to the method adopted by the cement industry to meet foreign competition in certain parts of New York. The following are quotations from this letter: "On July 12, 1935, the domestic cement industry, marketing its product in Greater New York City, adopted a sales policy in one section of the city, namely, the South Brooklyn section of Brooklyn, which, if allowed to continue, will increase our competition in the building industry to such an extent that we shall be forced to seek the purchase of other cements, domestic or foreign, which will place us on a comparative basis with other direct cement purchasers. This statement is not made with the desire that the domestic cement industry should market its product below cost. Nor do we desire in any form to inject our thoughts, if any, to methods of overcoming foreign invasion of the market. But in developing particular sales policies, the cement industry should give deep thought that our industry, which to the present time has always supported the cement industry sales practices, should not be curtailed in production. Our industry statistics show that 50% of our product is consumed on work not requiring U. S. A. manufactured or special tested cement. Thus, the new sales policy, in eliminating this percentage of our production, will invoke undue hardship on our employes and if we allow it to continue, without seeking other sources of low price material, will in time force us out of business. Our real competition in marketing our product is the contractor's cost of mixing and producing the product directly at the site of construction. The largest item in the contractor's total cost is his purchase price of the raw materials, in which paper package cement has always been the greatest factor. The cement industry has now decreased this paper package cement cost to the contractor in New York City as much as 36c per bbl. dependent on the location of the work. This 36c per bbl. decrease in cement cost will average a decrease in contractor's cost of 54c per cu. yd. of concrete. Our industry, either due to plant location and/or the handling of cloth sacks or bulk cement, is unable to receive any advantage of this decrease in cost of cement and there is no question that with the present quantity of production we cannot absorb this difference without involving a cash operating loss."

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Worrall Bros., Louisville, Ky., who have been making cinder-concrete building block since October, 1934, are planning to add cinder-concrete brick and cinder-concrete floor joists as well as special sizes of block. New equipment will include a roll crusher, vibrating screen and magnetic separator.

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Buffalo Gravel Corp., Buffalo, N. Y., has recently added a fleet of Chevrolet trucks with mixer bodies to their ready-mixed concrete facilities.

Concrete and Construction Co., Inc., Spartanburg, S. C., is a new company producing and marketing ready-mixed concrete.

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Insulated Natural Stone Co., Milwaukee, Wis., a newly organized concern, is manufacturing a new and novel concrete product—a cinder-concrete building unit with a natural stone face. The new product, according to the manufacturers, has the exclusive properties of being light in weight but meeting all building code regulations for strength, having great insulation value, being cheaper per square foot than ordinary face brick and having the natural beauty of rough cut stone. The manufacture of the product is simple. A flat stone slab about 2 in. thick is set on edge in the center of a wooden box form. Waterproofed, aerated cinder concrete is then poured in the form, making a "sandwich" of concrete with the natural stone in the middle. It is shipped to the building site in this form where it is split in two, each piece comprising an outer veneer of stone an inch thick, backed up with several inches of insulating cinder concrete.

Prices Bid—Contracts Let

Waynesville, Ill.: Contract let for 10,000 cu. yd. highway gravel to Prothero & Willis, Bloomington, for 17c per cu. yd. piled at pit; to B. W. Livengood, Heyworth, for 21c.

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Red Wing, Minn.: Board of public works increased the price of sand to private parties from its municipal plant from 75c to $1.50 per cu. yd. It was alleged that some purchasers are screening and grading the sand and making a profit because of its low first cost.

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Port Clinton, Ohio: County commissioner bought 1150 ft. of 10-in. concrete pipe from the Toledo Concrete Pipe Co. for 27c per ft.

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Lisbon, Ohio: Contract awarded Standard Slag Co., Youngstown, for 1194 tons of crushed slag at $1.76 per ton, delivered.

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Seneca, Ohio: Contract awarded H. C. Maruart, Tiffin, for 1723 tons No. 1 (Ohio State Highway Department specifications) crushed stone at $1.31 per ton, and 670 tons No. 7 crushed stone at $1.11.

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Eaton, Ohio: Bids for crushed stone chips for street improvement (about 1400 tons), Charles Plummer, Richmond, Ind., $1.40; crushed gravel, White Gravel Co., Camden, $1.45.

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Marion, Ohio: For high school, about 80 tons of sand and gravel purchased from Marion Sand and Gravel Co. at 75c per ton.

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Silica

A. Morris Sides, Los Angeles, Calif., has leased from C. E. Montgomery, Redlands, Calif., a silica deposit in San Diego county, and will begin shipments in the near future.

Sand-Lime Brick Production and Shipments in June, 1935

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States and Canada. The accompanying statistics may be regarded as representative of the industry.

Eight active sand-lime brick plants reported for the month of June, this number being the same as that reporting for the month of May, statistics for which were published in July.

Average Prices for June

Shipping Point	Plant price	Delivered
Grand Rapids, Mich...	$10.00	.....
Mishawaka, Ind.	9.25	.....
Syracuse, N. Y.	14.00–20.00	16.00–20.00
Saginaw, Mich.	10.50	.....
Sioux Falls, S. D.....	11.50	.....
Madison, Wis.	.....	14.00
Toronto, Ont., Can....	12.00	13.50

Statistics for May and June

	May*	June*
Production	1,821,120	1,582,300
Shipments (rail)	125,000	206,000
Shipments (truck) ...	1,753,661	793,095
Stocks on hand.....	1,374,199	1,859,799
Unfilled orders	810,000	600,000

*Eight plants reporting; incomplete, three not reporting unfilled orders.

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Sioux Falls Pressed Brick Co., Sioux Falls, S. D., is filling an order for 650,000 brick for Washington high school, a local PWA job.

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The Paragon Plaster Co., Syracuse, N. Y., furnished brick for the Young Live Stock Building, State Fair, Syracuse, N. Y., for which Anthony Link & Son are general contractors.

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Missouri Hardstone Brick and Tile Co., Pacific, Mo., resumed operation during the latter part of June after a shutdown of several months.

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Bentonite

J. J. Mayou Co., Denver, Colo., has purchased 870 acres of bentonite deposit land four miles south of Osage, Kan. It is estimated that the land contains six million tons of raw material which will be run through the plant in Newcastle.

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John G. Bagley and **Worth Bagley,** Redondo Beach, Calif., have established claims to a bentonite deposit in Imperial County, Calif., near the Riverside County line.

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Slag

Stroth Bros., Wellston, Ohio, slag crushing plant collapsed July 1. It was of timber construction and will not be rebuilt as only a small supply of slag remained to be recovered. The Wellston Iron Furnace Co. had shipped more than a million tons of slag to its cement plant at Superior, Lawrence county, before the Stroth brothers contracted for the remainder. They had probably shipped a quarter-million tons.

Importance of Proper Wire Rope Lubrication

By W. C. Russell*

STEEL has replaced many of the softer materials of construction during the last 50 years and perhaps it is because wire rope is descended from fiber cordage that the possibilities of its lubrication have been overlooked for so many years.

Because it has metallic surfaces in sliding contact, wire rope is a machine that should be lubricated. But, unlike most machines whose sliding surfaces are compacted within a small space that can be readily enclosed, wire rope has its entire surface exposed. Its entire surface, therefore, requires lubrication. External lubrication will prevent abrasion and wearing away of the metallic area of the rope. The more surfaces there are that come in sliding contact with a rope, the more benefit there is to be derived from this external lubrication.

The greater benefit, however, comes from *internal lubrication.* A wire rope is intended as a flexible medium for transmitting a load. To maintain this flexibility at its maximum value throughout the life of a rope, it is essential that its moving parts, which consist of its individual wires, be separated from one another by a film of lubricant.

With present day practice of increasing speed on all types of machinery, this is being forcefully brought home to the user of wire rope because a rope in order to flex at high speed must have the minimum frictional resistance between its component wires. The principal difference between a rope and a solid steel bar is the possibility of sliding or molar movement between the wires of a rope when it is flexed. At high speed, even a small resistance to this movement retards easy flexing and causes the bending stresses in the wire to increase with corresponding increase in total rope stress and decrease in the fatigue life of the rope.

Until a few years ago, wire rope was fabricated with no internal lubricant whatever, or, at best, with just sufficient light oil to facilitate its fabrication. The diversified application of rope cut from a stock reel was probably an excuse for the manufacturer to think that, should lubrication be desirable, it could be applied after the rope was installed and could be suited to its individual application. However, to get the most suitable lubricant on the inside of the rope after it is installed is impossible. The lubricant must be *built into* the rope when it is manufactured.

The proper lubrication of a rope during manufacture may be divided into three steps:

1. Lubrication of the fiber center.
2. Lubrication of the wire strands.
3. External lubrication of the rope after completion. Each of these subdivisions requires a separate type of lubricant and a separate type of application.

Lubrication of the Fiber Center

It was formerly thought that the hemp center, because of its fibrous and resilient nature, would act as a reservoir for lubricant, giving out quantities of oil to the strand of wire as the rope operated. If the hemp center had a chance to relax and assume its original shape at occasional periods, it might do this. But as used as the core of a wire rope, it is compressed to a fraction of its original volume, even when there is no load on the rope. It might be compared to a sponge that is held continuously compressed. The sponge in this condition would have little capacity for absorbing liquid.

Although loading the rope causes a slightly further compression of the core, this is not sufficient to cause a noticeable effect so far as lubrication of the rope strand is concerned, especially after the breaking-in period of the rope. Furthermore, the constituent fibers of the core of a wire rope do not absorb any appreciable quantity of oil themselves. They are what is known as hard fibers and the oil retained on the surface of the fiber and between the voids of the core is all that is contained in the core.

In selecting a lubricant for a hemp center, then, we can confine its properties to preserving the center itself. The ideal lubricant is one that will prevent bacterial disintegration and reduce frictional wear between the fibers. It should neither harden nor soften the fibers, since to do so would affect the compressibility of the core and also the resiliency of the wire rope. It must, of course, be chemically neutral and be resistant to the action of acid or alkali water. It should not flow freely at a temperature of 135 deg. F. because operating ropes sometimes reach this or even greater temperatures. Also, it should not saponify nor be washed out by water. It should adhere to the fiber for the longest possible time.

Lubrication of the Wire Strands

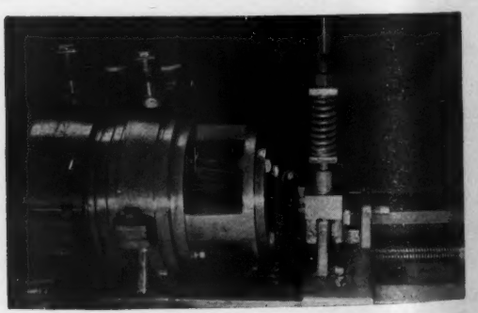
The inside of the strands of a wire rope is probably the most important part as far as lubrication of a wire rope is concerned. This portion of the rope cannot be seen or inspected, and the life and safety of the rope often depends on the condition of the inner wires.

The surface contact between the wires is very small, being that of cylinders in contact longitudinally. Since a point or line contact cannot actually exist physically, the surface to be lubricated comes from the slight deformation of the wires due to the pressure between them. It can be readily seen that in the case of steel wires, this deformation and resultant area of contact is very small. Hence the unit pressure between the wires is very great. These surfaces are in sliding as well as rolling contact.

To keep these wires separated so there will be no metal-to-metal contact with such a high unit pressure requires some very unusual properties in the lubricant. It must have a very heavy body and at the same time be fluid enough to pass readily around the wires as the geometrical shape of the voids in the strands changes with the operation of the rope. In other words, when the rope flexes over a sheave or drum at high speed, the grease must not constrict the relative movement between the wires, since this would increase the bending stresses in the wires and defeat the purpose of the lubri-

*Wire Rope Engineer, Macwhyte Co., Kenosha, Wis.

Showing where the lubrication is placed when the rope is manufactured



Stranding the wire rope—where the proper lubrication is applied in the manufacturing operation

cant. At the same time, the lubricant must not become a thin fluid at temperatures in excess of 135 deg. F. since it would then flow off when the rope had reached a normal working temperature. Conversely, it must not harden up and become solid at winter temperatures. Furthermore, the lubricant must not evaporate appreciably or harden on exposure to the weather, and should not crack or peel.

External Lubrication of the Rope After Completion

The exterior of a rope is subjected to the greatest unit of pressure of any of its component parts, and if given a separate lubrication, it should receive the heaviest, as well as the most tenacious, of lubricants. This lubricant should have the property of forming a tough skin on exposure to the air so that it will have less tendency to accumulate dust and grit. The application of this heavy lubricant should help to seal up the rope against the intrusion of moisture or dust, and provide a film of protection between the rope and the sheaves or other parts with which it comes in contact.

It is not always desirable to apply a lubricant to the outside of a rope because of the fact that in some installations it becomes mixed with dust and forms a paste which prevents ready inspection of the wires in the rope.

Lubrication of a Rope in Service

There is also the problem of lubricating a rope after it has been placed in service. Perhaps it is because it is hard to visualize a wire rope as a machine containing sliding metallic surfaces in contact—or perhaps it is because it is so difficult to apply a lubricant that will show practical results in increased rope life—that the user overlooks the value of keeping a rope lubricated.

On many jobs where wire rope is used, you will find the operators using a proper type of grease or oil on engines and bearings, and applying it to those parts with religious regularity. But the wire rope, if lubricated at all, gets an application of either black oil or discarded oil drained from the crankcase of a gas engine—and this only when the plant is shut down or the operator has an abundance of leisure time. The wire rope in such cases appears to be lubricated, but so far as actual lubrication is concerned, the surfaces can have as close metallic contact as though they were lubricated with water.

In the first place, a wire rope requires a heavier lubricant than that applied to the cylinders of an internal combustion engine or found in the residuum of the refining process. And in the second place, these products are not always chemically neutral, with the result that corrosion of the rope is assisted rather than prevented. Furthermore, the lubricants will flow off the rope as readily as they flow on, and what little effect they have is soon lost.

The inconvenience and time consumed in applying the recommended types of dressings are probably responsible for their limited use. Since penetration is paramount if any of the lubricant is to reach the innermost wires and the hemp center, the lubricant must be applied in a much thinner form than is best suited to operating conditions. Care should first be taken to see that the rope is perfectly dry and free from moisture. If any dirt or grease that may contain dust or dirt or gritty material is present on the outside of the rope, it is advisable to clean it off with compressed air or steam, or by brushing with wire brushes.

Two methods are available for thinning the lubricant to make it flow to the inside of the rope. One is to heat it until the desired body is obtained, and the other is to dilute the lubricant with naphtha or benzine sometimes with an oxidizing agent added—this thinning agent drying off after exposure to the air. Of the two methods, the second is to be preferred for convenience in application. It has the further advantage, also, that the lubricant remaining on the outside of the rope will thicken up faster than that on the inside due to exposure to the air, and this will seal up and prevent the lubricant inside from running off. On the other hand, the method of heating the lubricant has the advantage of helping to dry off any moisture that might be present on the rope. The selection of proper lubricant to be applied after the rope is in operation should receive careful consideration by the wire rope user.

In conclusion, let me repeat that a wire rope is a machine—and that to reduce the mortality of the machine, lubrication is vital. It is just as important to properly lubricate a wire rope as to make it of the proper materials. Furthermore, it is equally important to find some means of *keeping* the rope properly lubricated.

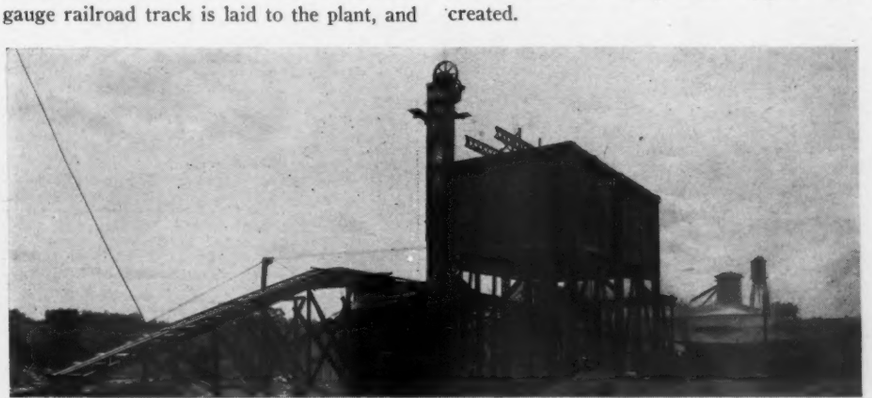
Lime Plant Adds Crushed Stone and Special Product

SUPERIOR LIME AND HYDRATE CO., Pelham, Ala., during the last few months has installed a simple crushing and screening plant to market its lime plant spawls. The new crushing plant consists of two steel bins side by side with an over-all length of 33 ft., a width of 16 ft. and a height to the bin floor of 11 ft., capable of holding 100 tons of crushed rock. A 36-in. narrow-gauge railroad track is laid to the plant, and the regular 2-ton quarry dump cars are used to haul the waste rock up a slope to dump into the No. 4½ Champion jaw crusher. The hoist used to pull the cars out of the quarry is used to move the cars to the crusher. The crushed material is elevated to the top of the bins by a Link-Belt elevator and discharges by means of a chute to a rebuilt vibrating screen, capable of giving two sizes, which go to the two bins. Gates in the bin floor discharge to railroad cars below the bins. The crusher has a capacity of 20 tons of crushed rock per hour.

The company is also making a new product "Calcidite" for the Union Chemical Co., Birmingham, Ala. It consists of 90% by weight of quick lime pulverized to 60 mesh, mixed with 10% soda salts supplied by the chemical company. The final product sells for $40 per ton, and is used on bituminous roads. When the bituminous roads are laid, this product is spread uniformly over the surface and sprinkled, after which it is rerolled. It is said to give a harder surface and to speed up hardening.

Silicosis Studied in Massachusetts

THE state government has recently established the Massachusetts Division of Occupational Hygiene, near the state house in Boston. A special investigation and study is being made of the silicosis hazard in industry. Dr. Manfred Bowditch is director. A chemical and engineering laboratory and staff has been placed at his disposal, and he is prepared to give advisory service to any industry that asks for it. The dust control work of the division is the particular job of Edward C. Riley, Cornell-trained engineer, who has had industrial experience in testing and designing heating, blowing and ventilating apparatus and in water filtration and sewage treatment works. Dr. Bowditch's own experience since his graduation at Harvard in 1912 has been largely as industrial hygienist with the General Electric Co., where he was engaged in improving the ventilation and lighting of the plant and the posture of employes at their work. He was special assistant to the state commissioner of labor and industries for two years before the new division of occupational hygiene was created.



Crushed stone screening plant of Superior Lime and Hydrate Co., Pelham, Ala.

New Machinery and Equipment

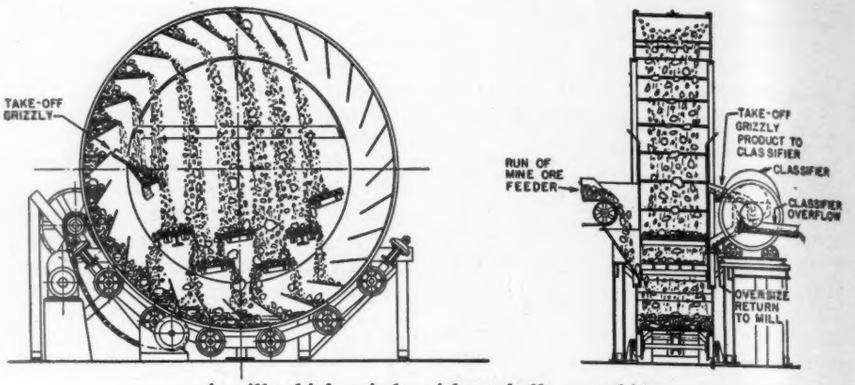
Improved Mill

THE ORIGINAL "Hadsel Mill," announced three years ago, has undergone extensive development by the Hardinge Co., York, Penn., since that time. The interest shown in the original mill indicated that there was a demand for a crushing and grinding unit of a type that would take run of mine ore and reduce it in one operation to the product desired.

The first commercial sizes of mills were built with the drum supported by an overhung shaft, on which were located inside and outside buckets with stationary breaker plates suspended from the opposite tank wall into the drum. The whole drum was partially submerged in a narrow tank. An overflow weir on one side, with an adjustable baffle, was used to obtain classification. The ore was fed into the center of the drum, where it was raised by the inside buckets and dropped on the breaker plates from a considerable height. The fines were suspended in the water and were discharged at the overflow weir. The coarse ore settled back in the buckets. Intermediate sizes settled in the tank, which were scooped out by the outside scoops and deposited back in the drum for further treatment.

The present design uses the basic principle of the original mill, in that it lifts the ore in buckets inside the drum and drops it on sloping breaker plates at a sufficient height to cause a violent crushing and grinding action, free of interference between particles and undergoing reduction, but there the similarity ends.

By referring to the diagram, the new method of operation can be readily understood. The drum is suspended in the cradle on wheels with roller bearings. The walls are extended in the drum above the buckets, so that it operates as a self-contained unit. The ore is dropped on the breaker plates, where both fines and coarse drop back into the buckets again. Enough water is added to the mill to create the proper consistency. On the rising side of the mill, ahead of the first breaker plate and above it, is located a take-off grizzly. This is the heart of the operation of the unit, as this grizzly rejects the coarse oversize and allows it to pass directly back into the mill on the first breaker plate, while the undersize flows by gravity to an outside classifier, where in turn the final classification, where products ranging anywhere from 20-mesh on up to 200-mesh are obtained through the ordinary means of control of classifier speed, density, etc. The oversize from the classifier returns to the mill, also by gravity, and thus the cycle is completed.



A mill which grinds without balls or pebbles

Following are given two typical operation reports taken from actual mill records, one on a small mill of 50 tons capacity and another on a larger mill of over 200 tons capacity.

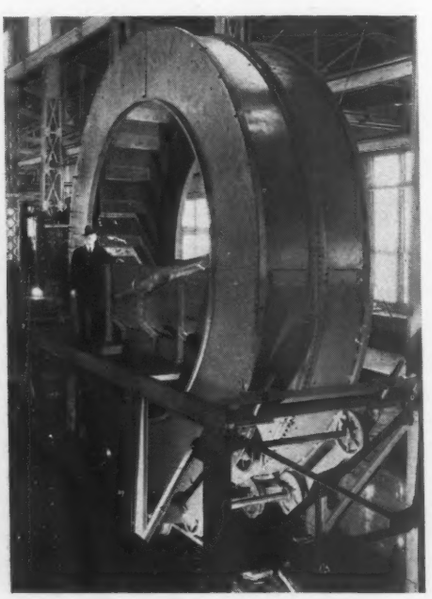
Operating Data

At the Slide Mines, near Boulder, Colo., a Hardinge-Hadsel mill is grinding a gold ore composed of quartz stringers in granite in closed circuit with a Hardinge counter-current classifier. The product goes to concentrating tables followed by flotation.

Mill—20 ft. diameter.
Classifier—3 ft. x 8 ft. Hardinge counter current classifier.
Feed—Run of mine ore—Maximum 10 in. x 15 in.
Product—5% plus 65-mesh.
Capacity—55 tons per 24 hours.
Power—29 hp.
Speed of mill—3.0 r.p.m.
Per cent solids in classifier overflow—35 to 40%.

Another mill in California is grinding ore from three different mines, two-thirds of the ore is a tough altered schist and one-third is quartz. The subsequent treatment is flotation followed by cyanidation of the concentrates.

Mill—24 ft. diameter.
Feed—Maximum size piece 8 in. x 15 in.
Product—0.7% plus 80-mesh, 71.7% minus 200-mesh.
Capacity—232 tons per day of 24 hours.
Power—90 hp.
Speed of mill—2.67 r.p.m.
Estimated metal consumption of breaker plates and buckets—½ lb. per ton.



Shop view of improved mill

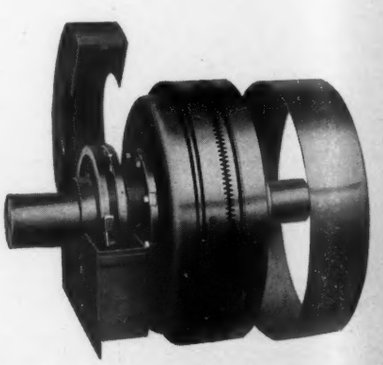
Magnetic Clutch

DINGS MAGNETIC SEPARATOR CO., Milwaukee, Wis., is marketing a newly patented magnetic clutch coupling designed to insure positive quick engagement and disengagement, with less than 1½ deg. of slip. This device has already found wide application on hot and cold strip mill secondary screwdown shafts, soaking pit covers and on many other applications where positive engagement and remote control is necessary or desired.

The Type SCC clutch is claimed to transmit unusually high torque, five times that of an ordinary friction type clutch of the same diameter and of either the single disc or multiple disc design.

The illustration shows the structure with cover plate removed. Internal coil springs disengage the clutch. Bronze teeth engage steel teeth in the outer periphery. Lag, due to residual magnetism, is overcome entirely. Instant disengagement follows. The cover plate prevents dust and dirt from lodging on the engaging teeth. Engagement is so rapid that "racking" of the teeth is said to be impossible.

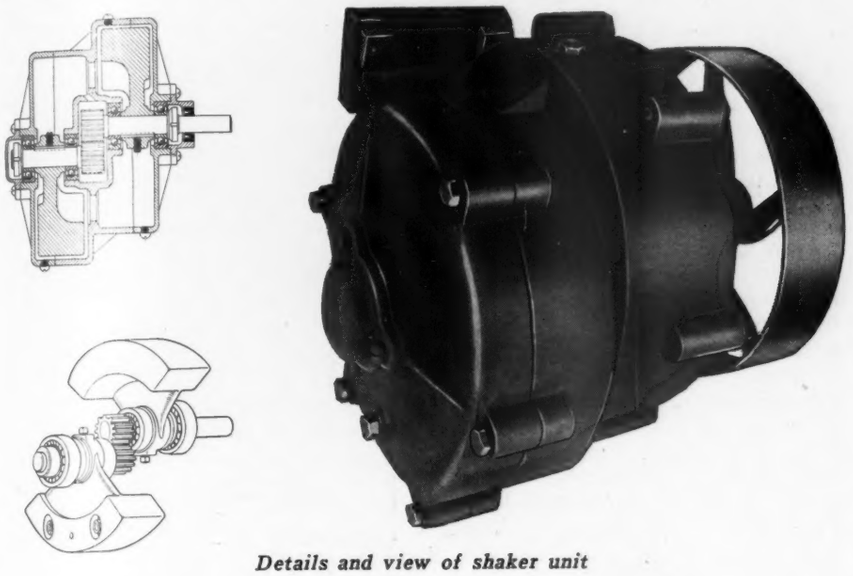
A 12-in. diameter Type SCC clutch is claimed to yield more than 1500 ft.-lb. torque. The structure is covered by U. S. Patent 1,989,984.



New magnetic clutch

Shaker Unit

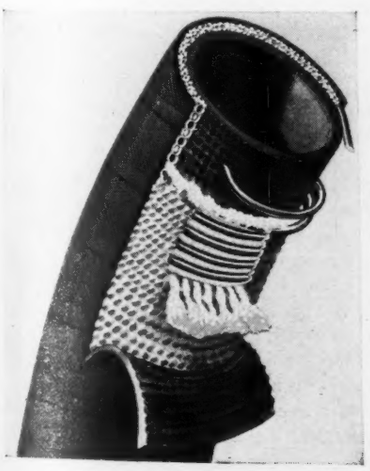
AJAX FLEXIBLE COUPLING CO., Westfield, N. Y., has placed on the market the "Shaler shaker," for shaking screens, barrel loaders, etc. It can be operated horizontally, vertically, or at any angle. The range of oscillation can be varied from 0 to 1 in. The accompanying illustrations clearly show details.



Details and view of shaker unit

A Lighter Suction Hose

A NEW TYPE of construction of suction hose which has a woven tubular reinforcement of cabled cords and wire has been developed by the Electric Hose and Rubber Co., Wilmington, Del. It is claimed that this hose, although light and strong, cannot collapse. This "Delmar" suction hose is made in all sizes up to 4-in. inside diameter, and can easily be connected to standard couplings on the job.



Section of new suction hose

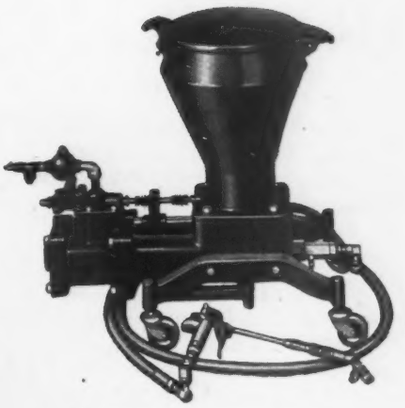
High Pressure Barrel Pump

THE NEW high pressure, air-operated barrel pump introduced by the Alemite Corporation, Chicago, Ill., converts any original 100-lb. lubricant container into an efficient powergun for industrial and truck lubrication. Utilizing a nitralloy piston, a low pressure pump carries a continuous flow of lubricant from the container to a high pressure pump. From there the lubricant is delivered at the rate of 18 oz. of regular lubricant per minute, or 6½ oz. of the extremely fibrous and heavy lubricants. A

Lubricant pump

pressure, 33 times the air pressure used, is available to furnish a delivery sufficient to take care of several outlets at one time.

Removal of the barrel pump's top cover, held in place with one bolt, gives access to all the working parts of the double action



Air-operated grease pump

air motor. The check valve may be cleaned without detaching the hose from the gun.

This maroon, chrome plated barrel pump is provided with either a three or four-wheeled truck for portability or a base for stationary installation.

The "Rock Crusher"

Another piece of equipment designed by the Alemite Corporation, particularly to weather the most rigorous demands of industrial and truck lubrication, the HR-25 twenty-five pound air operated Powergun is appropriately called the "Rock Crusher." At high pressure it is claimed to easily pump extremely fibrous and heavy lubricants, furnishing a large constant volume. A thoroughly dependable double action air motor operates a large worm which forces the lubricant to the high pressure piston; the lubricant is then quickly delivered to the largest bearings at the rate of 12 to 18 oz. per minute, utilizing the 150 to 200 lb. of air pressure. It comes complete with 10 ft. of volume high pressure hose, four casters for ready portability, a one-hand control valve for push type and hydraulic fittings, and a pin type adapter. HR-25 has a companion piece of equipment in the HR-32, the electric "Rock Crusher" operated by a ½ hp. electric motor.

New Equipment Manufacturer

BUELL ENGINEERING CO., 70 Pine St., New York City, has been organized to manufacture the "Buttner" drying systems of the rotary, turbo, and fine-film types, as well as the "Van Tongeren" system of dust extraction for fly-ash from stack discharge as well as for the collection of dust from chemical and cement plants. Units will be manufactured by the Struthers-Wells-Titusville group which is associated with the new company. It is also linked with Buell Combustion Co., Ltd., of England, and thereby with New Consolidated Gold Fields. The Buell Engineering Co. includes on its board of directors: H. S. Emlaw and F. C. Baker, directors of Gold Fields American Developments; S. H. Mezies, representing the English interests; and T. J. Dillon, of the Struthers-Wells-Titusville Corporation.

Rock Products News Briefs

Cement

Washington-Idaho Lime Products Co., Orofino, Ida., is completing erection of a rotary kiln and plans to be ready to manufacture portland cement during August.

◈ ◈ ◈

Lehigh Portland Cement Co., Metaline Falls, Wash., began operation July 8 after a shutdown since February 1. During that time extensive building and repairing were done, which make it possible for the plant to make any special kind of cement that may be required by the Grand Coulee dam. Some changes were made among the officers, but H. H. Helwig remains superintendent and C. E. Oswald, assistant.

◈ ◈ ◈

Southwestern Portland Cement Co., El Paso, Tex., suffered a blasting accident on June 26, which cost the lives of Stephen Sparks, 17, son of H. S. Sparks, superintendent, and one or two employes. Earlier news dispatches placed the number killed much higher. Premature explosion of the charge during loading is supposed to have caused the accident.

◈ ◈ ◈

Lehigh Portland Cement Co., Oglesby, Ill., suspended operations July 1 for an indefinite period. Shipments will be made from stock.

◈ ◈ ◈

Consolidated Cement Corp., Fredonia, Kan., operation was interrupted by recent floods.

◈ ◈ ◈

Pennsylvania - Dixie Cement Corp., Richard City, Tenn., lost a 170-ton cargo of cement when a barge recently sank in Battle Creek, two miles north of Richard City. The cement was consigned to highway contractors between Chattanooga and the Tennessee river. A. E. Legg, superintendent, who was below deck examining a leak, had a narrow escape.

◈ ◈ ◈

Brooklyn, N. Y.: Leading producers of portland cement have reduced the price of their product in the four counties of Long Island by 36c per bbl. The reduction brings the quotation to $1.82 per bbl., packed in paper bags and loaded on the trucks of dealers from the barge. The greater part of the cement affected by the cut in price is being delivered along the Gowanus-South Brooklyn waterfront. The New York City *Journal of Commerce* comments as follows: The reduction in the price of cement at certain points in Long Island is unlikely to be followed by similar reductions elsewhere, according to officials of leading companies. The reductions in Long Island are restricted to a selected list of dealers, to enable them to meet the competition of the sharply increased volume of low-priced foreign cements, it is explained. Carload and bulk prices have continued unchanged elsewhere however, since the termination of the NRA codes. The cost of shipping prevents this low-priced cement from affecting quotations at other points. The chief danger in the Long Island price reductions is that foreign cement shipments may be diverted to other Atlantic ports as a result. Generally lower prices along the seaboard might thus result. However, it is pointed out that prices of American cement at several other eastern ports have been above the New York level for some time past without attracting increased foreign shipments.

◈ ◈ ◈

American Portland Cement Co., Foreman, Ark., a boom period promotion which has been dormant for five or six years, is coming to life again with the help of an RFC loan, according to local newspapers. The plant was never more than half completed, although added to from time to time over a period of several years, as small blocks of stock were unloaded. With the help of Congressman Ben Cravens, of Arkansas, it is said an RFC loan of $193,000 has been made available, contingent upon the owners' or promoters' raising another $107,000 of the $300,000 needed to complete the plant.

◈ ◈ ◈

Ideal Cement Co., Denver, Colo., is reported to be contemplating use of the waste gas at its Ada, Okla., mill to manufacture dry ice, and has organized the Dry Ice Co., owned by same officers as Ideal. The start will be 15 tons daily.

◈ ◈ ◈

Statistics: The portland cement industry in June, 1935, produced 8,730,000 bbl., shipped 7,624,000 bbl. from the mills, and had in stock at the end of the month 23,098,000 bbl. Production in June, 1935, showed a decrease of 0.9% and shipments of decrease of 10.7%, as compared with June, 1934. Stocks at mills were 6.9% higher than a year ago. The total production for the first half of 1935 amounts to 33,642,000 bbl., compared with 37,115,000 bbl. in the same period of 1934, and the total shipments for the first half of 1935 amount to 31,926,000 bbl., compared with 35,165,000 bbl. in the same period of 1934. The statistics here given are compiled from reports for June, received by the Bureau of Mines, from all manufacturing plants except two. In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 164 plants at the close of June, 1935, and of 163 plants at the close of June, 1934.

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

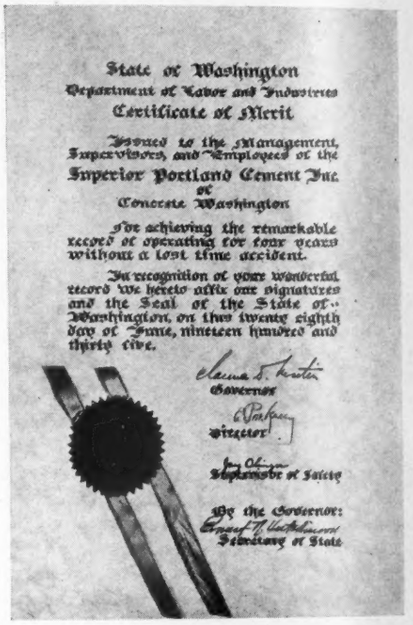
	June 1934	June 1935	May 1935	April 1935	Mar. 1935
The month	39.8	39.6	36.1	27.9	18.9
The 12 months ended	27.1	27.7	27.7	27.9	28.0

Superior Cement Receives State Safety Award

FOLLOWING are quotations from a letter from Gordon Tongue, treasurer, Superior Portland Cement, Inc., Seattle, Wash.:

"We held our Safety Trophy Re-dedication at Concrete on the 28th of June, commemorating four consecutive calendar years of no lost-time accident. As a matter of record, our last accident was on January 23, 1930. We have therefore operated over five full years with a perfect record.

"We had a very splendid ceremony at Concrete. C. L. Wagner, our vice-president in charge of operations, gave the welcoming address. The re-dedicated trophy was presented on behalf of the Portland Cement Association, by Frank J. Barrett, district


State of Washington
Department of Labor and Industries
Certificate of Merit

Issued to the Management, Supervisors, and Employees of the
Superior Portland Cement Inc.
of
Concrete Washington

for achieving the remarkable record of operating for four years without a lost time accident.

In recognition of your wonderful record we hereto affix our signatures and the Seal of the State of Washington, on this twenty eighth day of June, nineteen hundred and thirty five.

Governor
Director
Supervisor of Safety
By the Governor:
Secretary of State

manager, and was accepted on behalf of the company and the employes by H. A. Ambler, our general superintendent.

"The principal address of the day was given by Herbert S. Little, Seattle attorney. His talk was built around the thought that the employes of the cement plant were empire builders in the sense that the product they make is used to develop the great Pacific Northwest, and that working safely is the most suitable foundation on which to build for happiness. Service pins were presented to the employes who had worked continuously for twenty-five years: 5 for 25 years; 2 for 20 years; 3 for 15; 5 for 10 years; and one for 5 years.

"As a complete surprise to the management and the employes of the company, the Department of Labor and Industries of the State of Washington presented the company with a certificate of merit signed by Governor Clarence D. Martin; the director of the department, E. Pat Kelly; the supervisor of safety, Jay Olinger, and the secretary of state, Ernest N. Hutchinson."

Sand and Gravel Output Up in 1934*

THE INCREASE in construction in 1934 was reflected in an advance of about 40% in the output of commercial sand and gravel operations. Activity in local road-building projects, however, apparently slumped during the year, for preliminary returns show a decline in the production of sand and gravel reported by states, counties, municipalities, and other government agencies. Available data on consuming markets and partial returns from producers indicate that the total output of sand and gravel in 1934 amounted to about 113,000,000 short tons valued at approximately $65,000,000.

Sand and gravel sold for virtually all uses showed increases in 1934 compared with 1933. Molding sand, and fire and furnace sand reflected activity in the steel industry with advances of 30 and 41%, respectively. Increased output of building and paving sand and gravel accounted for most of the advance in total commercial production. Values also were higher in 1934 than in 1933. The average value of all sand advanced from $0.61 a ton in 1933 to $0.69 in 1934, gravel increased from $0.59 to $0.64. Salient statistics of the sand and gravel industry in 1933 and preliminary figures for 1934 are summarized in the accompanying table.

Non commercial Production

Since 1932 statistics of the sand and gravel industry have been broken down to show production by commercial operations and by noncommercial operations—states, counties, municipalities, and other government agencies. Noncommercial producers in 1933 reported a total of 41,648,877 short tons of sand and gravel with an average value of $0.33 a ton.

Only 13,645,409 short tons—about one-third—of the sand and gravel produced by noncommercial operations in 1933 was washed or screened to make it comparable in quality with the output of the average commercial plant. By far the larger part consisted of pit-run material having a low unit value.

Complete statistics from noncommercial producers are not yet available but partial returns for 1934 indicate a drop of about 10% in noncommercial output compared with 1933. An advance of about 21% in average value per ton is also indicated—from 33c to 40c.

Rail and Water Shipments

Shipments of sand and gravel on class I railroads in 1934 amounted to 27,683,407 short tons, an advance of 27% from 21,818,258 tons in 1933. This increase terminated an uninterrupted sharp decline since 1928. As preliminary figures of commercial production indicate an increase in output of only 14%, apparently the trend toward increased use of truck transportation also was arrested. In 1932 and 1933 only 38% of commercial production, exclusive of glass and molding sand and nonrevenue railroad ballast, was shipped by rail, but in 1934 preliminary figures indicate that 42% was carried on class I roads.

The upturn in rail shipments was fairly uniform over the entire country. The notable exception was the Southwestern Region where shipments in 1934 dropped 1% from 1933. Elsewhere increases ranged from 16% in New England to 85% in the Northwestern Region.

The quantity of sand and gravel shipped by barge on the Ohio and Monongahela rivers in the Pittsburgh district increased 3%, from 1,540,480 short tons in 1933 to 1,581,410 short tons in 1934.

Markets

More than half the output of sand and gravel from commercial operations is used in concrete construction, either highways or buildings. Portland cement consumption therefore provides a good indicator of demand for sand and gravel. Cement shipments in 1934 increased 18% from 1933, which checks closely the advance of 14% indicated by preliminary figures of commercial sand and gravel production. Shipments of paving asphalt, which also indicate demand for sand and gravel, increased 16% in 1934 compared with 1933.

Highway Construction

Concrete highway construction was maintained during 1934 at about the same low level as 1933. According to statistics of the Portland Cement Association total concrete-pavement contract awards were only 45,108,000 sq. yd., virtually no change from 1933 but a drop of 70% from the 1928 peak.

General trends in construction of bituminous roads are shown by statistics of asphalt shipments and road-oil sales. Shipments of paving asphalt increased from 798,607 short tons in 1933 to 924,135 short tons in 1934, an advance of 16%. Shipments of cut-back asphalts, commonly used for mixed-in-place bituminous surfaces, increased 23% from 508,533 short tons in 1933 to 624,183 short tons in 1934. Road oil sales also picked up in 1934, increasing 21% from 6,238,898 bbl. in 1933 to 7,702,753 bbl. in 1934. These data tend to confirm partial returns from sand and gravel producers, indicating that production of paving sand by commercial operations amounted to about 11,500,000 short tons in 1934, an increase of 5% from 10,903,447 short tons in 1933. Paving-gravel production apparently increased about 10% from 17,719,859 short tons in 1933 to about 19,500,000 short tons in 1934.

Nearly all the sand and gravel reported by noncommercial producers also is used for paving, and this material should be included in total figures for aggregates consumed in highway and road construction. Preliminary returns indicated that the quantity of sand and gravel produced by noncommercial operations in 1934 may have declined about 10% compared with 1933.

Building Construction

Total construction contracts awarded in 37 states east of the Rocky Mountains during 1934 were valued at $1,543,842,000 according to statistics of the F. W. Dodge Corporation. Although this total represents an advance of 23% compared with 1933 it is still 77% below the 1928 peak. Supplementary records of construction activity also show moderate advances in 1934. The value of building permits issued in 819 cities throughout the United States increased 6% from 1933; engineering-construction contract awards advanced 27%.

Returns from approximately half the commercial sand and gravel producers substantiate the indicators of demand for building sand and gravel. Production of building sand in 1934 was about 16,400,000 short tons, an increase of 26% from 13,024,174 short tons in 1933. The output of building gravel increased about 22%, from 11,934,080 short tons in 1933 to 14,500,000 short tons in 1934.

Railroad Ballast

Demand for railroad ballast declined sharply as a result of railroad economies during the depression, but in 1934 there was a moderate upturn in expenditures for ballast. Estimates of the Bureau of Railway Economics indicate that total ballast expenditures by class I roads in 1934 amounted to about $8,855,000, an increase of 13% from $7,814,385 in 1933. Although expenditures include all kinds of material used as ballast as well as transportation and unloading costs, about 60% of the reported expenditures represents actual cost of the material.

Preliminary returns from producers also show an increase in ballast production and all available data indicate an output of ballast gravel in 1934 mounting to 5,500,000 short tons, an advance of 12% from 1933. Railroad ballast sand may have dropped about 10% in 1934 compared with 1933.

Other Outlets

Production of glass sand in 1934 was about 1,920,000 short tons, 8% higher than in 1933, according to returns from companies which accounted for nearly 90% of the total output in 1933. This advance seems moderate, for the production of glass containers in 1934 increased 52% compared with 1933. The output of plate glass, however, the other large outlet for glass sand, barely surpassed the 1933 production. Illuminating-glassware production in 1934 advanced 9% from 1933.

*By H. H. Hughes and M. Allen, U. S. Bureau of Mines.

Activity in the steel and foundry industries was reflected in an increase of 30% in the output of molding sand in 1934 compared with 1933, and 41% in the output of fire or furnace sand.

The demand for grinding and polishing sand depends directly upon conditions in the dimension-stone and plate-glass industries, and preliminary returns indicate an increase in output of 1% in 1934 compared with 1933.

Freight-car loadings, which advanced 6% in 1934, may bear some relation to demand for engine sand, and reports of producers indicate an output in 1934 about 19% higher than in 1933.

Partial returns from producers show an apparent increase of 44% in 1934 in the output of filter sand and a drop of 31% in production of sands used for miscellaneous or unspecified purposes.

Sand and Gravel

Bellaire Sand and Gravel Co., Bellaire, Ohio, bankrupt, equipment was sold July 5 to trustees of the First National Bank of Bellaire for $6000. It is reported plans are being made to reopen the plant.

SAND AND GRAVEL SOLD OR USED BY PRODUCERS IN THE UNITED STATES 1933–34, BY COMMERCIAL AND NONCOMMERCIAL OPERATIONS, AND BY USES

COMMERCIAL OPERATIONS	1933 Short tons	1933 Value per ton	1934[1] Short tons	1934[1] Value per ton	Percent of change Tonnage	Percent of change Value per ton
Sand:						
Glass	1,781,423	$1.69	1,920,000	$1.75	+ 8	+ 4
Molding	1,718,251	.91	2,240,000	.95	+30	+ 4
Building	13,024,174	.50	16,400,000	.56	+26	+12
Paving	10,903,447	.51	11,500,000	.57	+ 5	+12
Grinding and polishing	572,735	1.29	580,000	1.75	+ 1	+36
Fire or furnace	106,133	1.14	150,000	1.55	+41	+36
Engine	1,051,695	.59	1,250,000	.75	+19	+27
Filter	24,387	2.14	35,000	2.00	+44	— 7
Railroad ballast[2]	721,381	.27	650,000	.31	—10	+15
Other	1,121,271	.45	775,000	.80	—31	+78
Total sand	31,024,897	.61	35,500,000	.69	+14	+13
Gravel:						
Building	11,934,080	.68	14,500,000	.67	+22	— 1
Paving	17,719,859	.59	19,500,000	.68	+10	+15
Railroad ballast[3]	4,928,031	.36	5,500,000	.41	+12	+14
Other[4]	499,605	.58	500,000	.50	....	—14
Total gravel	35,081,575	.59	40,000,000	.64	+14	+ 8
Total sand and gravel	66,106,472	.60	75,500,000	.66	+14	+10
NONCOMMERCIAL OPERATIONS[5]						
Total sand and gravel	41,648,877	.33	37,500,000	.40	—10	+21
COMMERCIAL AND NONCOMMERCIAL OPERATIONS						
Grand total	107,755,349	.49	113,000,000	.57	+ 5	+16

[1]Figures subject to revision.
[2]Includes some sand used for fills and similar purposes. The quantity of sand reported as used exclusively for ballast in 1933 was 550,948 short tons valued at $160,576. The figures include sand produced by railroads for their own use in 1933 as follows: Ballast, 50,811 short tons valued at $7694; fills and similar purposes, 170,433 short tons valued at $32,577.
[3]Includes some gravel used for fills and similar purposes. The quantity of gravel reported as used exclusively for ballast in 1933 was 4,668,597 short tons valued at $1,747,452. The figures include gravel produced by railroads for their own use in 1933 as follows: Ballast, 1,232,795 short tons valued at $247,522; fills and similar purposes, 259,434 short tons valued at $29,711.
[4]May include some gravel used by railroads for fills and miscellaneous purposes.
[5]By States, counties, municipalities, and other Government agencies, directly or under lease.

SUMMARY OF DATA RELATING TO PRODUCTION AND CONSUMPTION OF SAND AND GRAVEL[1]

	1933	1934[2]	Percent of change in 1934
Sand and gravel shipments:			
Rail shipments, class I roads[3]....short tons	21,818,258	27,683,407	+27
Water shipments: Pittsburgh district[4]....short tons	1,540,480	1,581,410	+ 3
Correlative industries:			
Portland cement shipments....barrels	64,282,756	75,917,000	+18
Paving asphalt shipments....short tons	798,607	924,135	+16
Cut-back asphalt shipments....short tons	508,553	624,183	+23
Road-oil sales....barrels	6,238,898	7,702,753	+23
Construction:[5]			
Concrete pavement contract awards[6]...square yards	45,128,000	45,108,000	....
Construction contract awards[7]....dollars	$1,256,601,000	$1,543,842,000	+23
Railway expenditures, class I roads: For ballast[8].....	$7,814,385	$8,855,000	+13
Glass production, monthly average:			
Glass containers[9]....gross	1,960,000	2,983,000	+52
Illuminating glassware[10]....turns	1,387	1,517	+ 9
Polished plate glass[11]....square feet	7,493,000	7,651,000	+ 2
Foundry activity:			
Foundry and malleable pig-iron product'n.gross tons	1,521,945	2,154,349	+42
Malleable castings[12]....short tons	268,638	369,458	+38
Freight-car loadings, all commodities:			
Total monthly average[13]....cars	2,415,000	2,566,000	+ 6

[1]Many of the data available in this table are published currently in "Survey of Current Business"; comparable data for 1928 are given in Minerals Yearbook, 1934, page 839.
[2]Figures for 1934 are subject to revision.
[3]Interstate Commerce Commission.
[4]Chief Statistician, Board of Engineers for Rivers and Harbors.
[5]Detailed statistics of construction are contained in the cement chapter in the report.
[6]Portland Cement Association.
[7]F. W. Dodge Corporation.
[8]Interstate Commerce Commission and Bureau of Railway Economics.
[9]Glass Container Association.
[10]Illuminating Glassware Guild.
[11]Plate Glass Manufacturers of America.
[12]U. S. Bureau of the Census.
[13]American Railway Association.

More Sand Co., Junction City, Kan., Roy More, president, is reported to have taken an option on property a half mile west of the city on the Republican river, to be developed if tests of the sand deposit justify.

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Meramec Portland Cement and Material Co., St. Louis, Mo., has petitioned the Federal Court for a reorganization under the amended federal bankruptcy law. George Raterman, president of the company, who filed the petition with the approval of the directors, said the assets of the company are $488,883.77, and the liabilities $457,713.75. He said the company was prosperous up to 1929 and under normal conditions can continue to do business profitably. The petition states two promissory notes, one for $100,000 and another for $60,000, are in default and $30,666.66 in interest has been due since May 7. The notes are secured by first mortgages on the plant of the company in St. Louis and on equipment. According to the petition the principal asset of the company is the plant in Sherman, St. Louis County, which is unencumbered, a $100,000 mortgage having been paid off. The St. Louis office of the company is at 1701 South Vandeventer avenue. Mr. Raterman said in the petition the holders of the notes were associated in the business and permitted the default on the notes in order to allow the money to go into expansion of the business. However, in May, 1932, they pledged these notes to secure personal loans and could not continue the policy in regard to default. The bulk of the assets listed includes real estate, machinery and equipment. Capital stock of the company is 3000 shares at $100 par and 1000 shares of $100 par 7% cumulative preferred stock. No dividends have been paid since 1920.

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Marion Sand and Gravel Co., Marion, Ohio, is one of several Ohio industrial concerns to take advantage of an R.F.C. loan. It was recently granted $7600 at 5% for a rehabilitation program.

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Ross Island Sand and Gravel Co., Portland, Ore., has petitioned for a reorganization under the amended federal bankruptcy law.

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Becker County-Shiely Co. and **J. L. Shiely Co.,** Glasgow, Mont., were hosts recently to 50 Glasgow business men. The local newspaper reports: J. L. Shiely, president of the Shiely company, supervised the tour and afterwards members of the party were guests at his home. A special "golf" contest was also conducted. The men later ate an abundant meal at the Cole commissary, followed by a brief program in which appreciation was expressed for Mr. Shiely's courtesy.

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Tennessee-Arkansas Gravel Co., C. C. Hawkins, president, has moved its plant from Rosedale, Miss., to Arkansas City, Ark.

Rock Products News Briefs

Gypsum

Victoria Gypsum Co., Cape Breton, Nova Scotia, is a new corporation organized by Boston, Mass., men. A $500,000 project is under consideration.

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Alaska: S. A. Perkins, of the Standard Gypsum Co., Tacoma, Wash., and Robt. B. Henderson, Pacific Portland Cement Co., San Francisco, Calif., were reported recently to have been investigating gypsum deposits near Ketchikan.

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National Gypsum Co., Buffalo, N. Y., is arranging to acquire the **Universal Gypsum and Lime Co.**, Chicago, Ill. The offer is reported as follows: One-half share of National 7% cumulative $100 par preferred stock would be given for each share of Universal's new $4 cumulative $60 par preferred stock. One and one-half shares of National Class A common of $5 par would be given for each ten shares of Class A and Class B common of Universal, both of the latter of $1 par. Universal only recently completed a reorganization, and many of the holders of old securities have not made exchanges for new stock. In these instances, a double exchange will be required. "Translated into terms of securities prior to reorganization," the letter read in part, "this means that each former holder of $1000 par of old bonds will receive five shares of National preferred and thirty shares of National Class A common." Consummation of the merger requires the approval and deposit of 51% of preferred and Class A common stocks of Universal. As soon as this mark is reached, Universal will make a formal offer to National. Acceptance, it is said, will be no more than a formality. The way is left open for National's operation of Universal as a subsidiary pending complete stock acquisition. National already has applied for registration of sufficient additional stock to swing the deal, as well as to wipe out its dividend arrears. Universal's shareholders would obtain a 34% interest in the company. In the literature mailed with the announcement of the plan is a statement showing National as a $5,000,000 concern and Universal as a $2,401,000 company. Earnings for March, April, May and June, after all deductions except federal income tax, are placed at $77,791 for Universal and $324,484 for National.

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United States Gypsum Co., Midland, Calif., plant activities have almost doubled in recent months, according to local reports, which state: The plants have all been running to full capacity, and the wallboard plant has been working two shifts. The business jump first began with big orders for the Exposition at San Diego. After the Exposition was built, general coast building kept up the production. Recently one large shipment of wallboard was shipped to Alaska, and had to have special crating.

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Cement

Aetna Portland Cement Co., Detroit, Mich., has leased a warehouse at Port Huron, Mich., recently constructed by the Louis Foster Builders Supplies Co., and will use it as a distributing center for the territory west and south of the city. Harold C. Foster will be in charge. The warehouse provides storage for 25,000 bbl. Cement will be brought in by water.

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Nebraska Cement Co., Superior, Neb., suffered some interruption to operation on account of the recent floods, which washed out the railway between the quarry and the plant. The company was able to take care of all orders from stocks on hand.

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Idaho Portland Cement Co., Inkom, Ida., plans to spend $40,000 for additional storage for 50,000 bbl.

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Bessemer Limestone and Cement Co., Youngstown, Ohio, has completed reorganization. Directors and officers are: R. C. Steese, chairman of the board; Chas. Schmutz, president; John R. Rowland, E. E. Swartswelter, Walter E. Meub, J. G. Butler III and Charles F. Smith, all of Youngstown, and Frank A. Scott and William R. Bailey, Cleveland, directors. George D. Treat is secretary and treasurer. "Our business so far this year is better than for the corresponding period last year," Mr. Schmutz said. "Prospective business is much better. There will be good demand for our products as soon as the $4,000,000,000 work relief program gets under way."

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San Francisco, Calif.: Active talk of a portland cement price war on the Pacific Coast, and of danger of foreign importations under reciprocal tariff agreements, appears to be largely of uninformed character and without much real basis of fact except that there has been some localized competitive pressure with possible tendency to price shading, writes H. C. Hendee in the *Pacific Coast Edition of the Wall Street Journal*. His comment continues, in part: Aside from the matter of competition and prices, however, the industry on the Coast has clearly been in a period of falling demand. One important reason for the drop in cement production has been the advanced stage of some of the big public works, notably the completion of Boulder Dam and the piers of the San Francisco Bay bridges. Metropolitan Water District and All American Canal will be heavy takers, however. In the Northwest, the Bonneville and Grand Coulee projects have not yet reached the stage of heaviest cement use. Highway cement demand has felt and is still feeling to some extent the competition of asphaltic road surface manufacturers who have obtained legislation to improve their competitive position. Current cement prices are generally regarded as low although local delivered quotations for commercial demand are not especially so, taken in comparison with freight differentials and mill prices as reported by the Bureau of Commerce. Carload lots as quoted in San Francisco are now $2.32 delivered. The freight differential in the San Francisco area is commonly calculated at about 27c per bbl. Big contracts, notably Boulder dam, however, have recorded sales very much below general average levels. Boulder contracts dropped as low as $1.12 f.o.b. mill in one instance and ranged up to $1.28. Composite mill price levels, computed by the Bureau of Commerce as the average for Coast territory by months since 1932, which was generally the low price point, show the following for the first five months of each year:

	1935	1934	1933	1932
January	$1.650	$1.650	$1.426	$1.321
February	1.650	1.650	1.436	1.323
March	1 658	1.650	1 436	1.318
April	1 667	1.575	1.436	1.318
May	1.667	1.570	1.436	1.318

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Superior Portland Cement, Inc., Concrete, Wash., closed manufacturing operations July 15 indefinitely. Shipments from stock, of course, will continue.

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Universal Atlas Cement Co., Chicago, Ill., has announced the appointment of the following district sales managers by A. O. Stark, sales manager; R. M. Beaton for metropolitan New York and northern New Jersey; B. J. Whittaker of Albany in charge of New York State, and C. L. Whalley of Newark in charge of northern New Jersey under Mr. Beaton.

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State Mineral Aggregate Associations Formed

OHIO AND WEST VIRGINIA have recently joined the ranks of states and localities in which producers of crushed stone, sand and gravel and slag have joined one association. The objective in both instances is to carry out the provisions of the late NRA code so far as possible.

Fluorspar Prices Up

STANDARD wash gravel fluorspar has been advanced $1.50 a ton to $14.50 by Kentucky and Illinois producers. Fluorspar is used as a flux by steel producers. The advance applies to the "85-5" grade.

Advance in fluorspar is seen in trade circles as indicating higher steel operations, as it is one of the necessary raw materials in steel ingot production.

THE INDUSTRY

New Incorporations

The Spartanburg Concrete Co., Charleston, S. C.; capital, $500. Officers are J. L. Von Glahn and W. C. Smith.

Miami Rock Products Co., Miami, Okla.; capital, $100,000. Incorporators are H. B. Cobban and W. J. Martin.

Clayville Sand & Gravel Corp., Clayville, N. Y.; building materials; capital stock, $10,000. Directors are Hobart L. Morris, Pauline F. Sherman and Mary R. Krieger.

Bristol Cinder Block and Concrete Products Corp., Bristol, Va.; to manufacture, buy and sell cement and cement products; maximum capital, $10,000. R. W. Kelly, Jr., is president.

Smelter Sand & Gravel Co., El Paso, Texas; construction; capital stock, $7500. Incorporators are Hugh McMillan, John Wood and K. M. Linker.

Atlantic Supply Co., Raleigh, N. C.; to buy, sell and deal in gravel, sand, stone, cement, building and construction materials generally; authorized capital stock, 1000 shares without nominal or par value, subscribed stock 3 shares, by Samuel Lawrence, L. R. Ames, and S. C. Webb.

Riverton Lime and Stone Co., Inc., Riverton, Va.; to manufacture, buy, sell and deal in lime and cements of all kinds; maximum capital, $239,000.

Wing Sands, Inc., Beloit, Wis.; to conduct and operate a sand and gravel business; 200 shares at $100 each. Incorporators are Martha R. and M. E. Wing and Edward C. Frederick.

The Batesville Stone and Marble Co., Batesville, Ark.; capital, $500. Incorporators are J. H. Scheid, Margarette Louise Scheid and John Seery.

Carolina Sand and Gravel Co., Kathwood, S. C.; capital, $25,000; 250 shares, $100 par value. Officers are C. G. Fuller, president; F. I. Gibson, vice-president; and Calhcun Lemon, secretary and treasurer.

J. W. Pacelli Concrete Corp., Bronx, N. Y.; concrete, mortar, cement, cinder; $2000.

Nu-Carth Stone Co., Carthage, Mo.; 1000 shares, no par value; capital, $3300. Stockholders are E. H. Wetzel, Luke J. Boggess and Mrs. Muriel B. Boggess.

Cherokee Concrete Co., Riverside Drive, Knoxville, Tenn.; to quarry stone and manufacture cement and concrete; capital, $60,000; initial capitalization, $1000. Incorporators are George P. Chandler, C. L. Carmichael and W. C. Kinzel.

Knoxville Lime Manufacturing Co., Asbury, Tenn.; $25,000 common stock. Incorporators are E. L. Osborne, W. W. Cowan and John Wray.

Personals

George Ruth has been appointed manager of Longview Concrete Pipe Co. at Kalama, Wash. The position was formerly held by **L. A. Perry,** who has resigned because of failing health.

Robert Wood, formerly of Kansas City, Mo., has moved to Dodge City, Kan., where he is now representative of the Ash Grove Lime and Portland Cement Co.

Miss Adeline Krueger, secretary of the Reese Stone Co., Evansville, Ind., was married to **Roy Hill,** an Evansville newspaper man, at Terre Haute on July 15.

Paul H. Price has been appointed state geologist for the West Virginia Geological and Economic Survey Commission, Morgantown, W. Va.

Obituaries

Bartholomew J. Donnelly, 68, president-treasurer of the Shea and Donnelly Limestone Co., Swampscott, Mass., died June 28 at the Charlesgate hospital at Lynn, Mass., where he had been confined for the previous four weeks. In failing health for the last year, his death resulted from an embolism.

John M. Snouffer, 66, for 14 years president of the J. & L. Snouffer Stone Quarries at Dublin, Ohio, died July 1 after an illness of more than a year. He was engaged in the road contracting business for many years. His wife, Mrs. Joslyn Snouffer, and a son, Lawrence F. Snouffer, survive him.

George J. Stubblefield, 68, vice-president of the Estill Springs Sand and Gravel Co., Nashville, Tenn., died July 10. In 1927, he had joined with others in the organization of the sand and gravel company. He was also identified with phosphate operations in Hickman county for several years. He is survived by his wife, a sister, and eight nieces and nephews.

Albert F. Scheuneman, chief mechanical engineer of Dobbie Foundry and Machine Co., Niagara Falls, N. Y., died June 27 following an operation.

Mrs. Blanche Evans, wife of J. H. Evans, president of the Washington-Idaho Lime Co., Evans, Wash., was killed July 8 when the automobile she was driving plunged from a 40-ft. embankment.

Quarries

Commissioners of the Unionville (Mo.) Special Road District bought a second-hand limestone rock crusher at Kirksville early in July for $700 and are planning to crush material for local street and road surfacing.

Mt. Pleasant, Iowa, is preparing to open a stone quary on the Peterson property south of Saunders park and will carry out a program of surfacing all unpaved city streets.

Waterloo, Iowa.: The limestone quarry on the O. J. Smith farm and the Coffin quarry have been reopened after a lapse of several months, and Tama county has resumed its emergency relief projects for surfacing roads.

Athens, W. Va.: The Mercer county farm bureau plans to erect a limestone plant at Athens, the construction to be financed by FERA. Fifty farmers were asked to agree to take 1000 tons of crushed limestone each at $1 a ton. A crushing plant is also contemplated for Bluefield, W. Va.

Winterset, Iowa: Madison county supervisors recently purchased a crusher, elevator and caterpillar from a Cedar Rapids firm for $3250, and are operating them at the Jackson quary to produce material for surfacing the county road from Earlham south to Road 2. About 175 to 185 tons of rock a day are crushed.

Parsons, Kan., city commissioners purchased a portable rock crusher, a concrete mixer, an electric motor and miscellaneous hand tools recently to supply material for municipal projects. The price was $2467.

Little Rock, Ark.: Pulaski county, which recently traded its own rock crusher to the state for other road equipment, has contracted with Justin Matthews and Henry Topf for the rental of a rock crusher north of Park Hill at a rate of 10c a ton, agreeing to use 3000 tons of rock during the next year.

St. Joseph, Mo.: Buchanan county was in the market early in July for a rock crusher of 12 to 15 yd. per hour capacity and asked for bids.

Eskridge, Kan.: The purchase of a rock crusher has speeded up the work on the local dam. The crusher will later serve on Gardner lake.

Mexico, Mo.: The Audrain county court has purchased a rock crushed from Brown-Struss Corp., Kansas City, Mo. The crusher will be used to produce gravel for surfacing ten miles of roads around Thompson, Mo.

California, Mo.: Government relief agents are contemplating the opening of a rock quarry on the William Murrill farm in the north part of Moniteau county. Forty men are employed at a government quarry near Lupus.

Washington, Iowa: Crushing operations at the Grace Hill quarry, Washington county, were begun about the middle of July. E. D. Wahl, Victor, Iowa, has a contract for surfacing Road 22 and for placing maintenance rock on highways already surfaced.

The Spring Hill (Kan.) township board, after trying out a used crusher which proved unsatisfactory, purchased a new rock crusher from Dixie Machinery Co. of St. Louis, Mo., and started production of material for township roads. The crusher has a capacity of 50 to 75 cu. yd. a day.

Weaver Construction Co., which has a contract for surfacing a state road from Mt. Pleasant, Iowa, to the Iowa state park at Oakland Mills and also the road from 161 to Pleasant Lawn, is securing its limestone from the Harshbarger farm near Oakland.

Wellington, Mo.: A quarry south of town has been opened under U. S. engineers employing relief labor.

Blue Rapids, Kan.: Under KERC, bridge work, road construction and other building projects are being undertaken. One quarry is at Beattie and three are near Frankfort. A new quarry near Oketo was recently opened up without a crusher.

Leavenworth, Kan.: Leavenworth county commissioners were recently contemplating the purchase of another rock crusher.

Walnut Grove, Minn.: SERA is carrying out limestone grinding projects in seven counties—Fillmore, Houston, Mower, Dodge, Winona, Wabasha and Olmstead. The crushers turn out 50 to 100 tons each daily at a cost of from 75 to 90c a ton, and with a hauling cost of about 5c a ton-mile. More than 10,000 tons has been distributed for fertilizing 5000 acres for alfalfa.

Portsmouth, Ohio: Scioto county commissioners have leased the limestone rights of the James and Rosa Hughes farm at Clinton Furnace, paying $1 a year for the lease and 8c a cu. yd. for the limestone taken from the farm. Roads in the eastern part of the county will be surfaced.

Fort Madison, Iowa: Lee county has purchased quarry equipment, through FERA, for use in Marion township and Sandusky quarries. Primary roads are being surfaced.

Saratoga, Calif.: The Santa Clara county quarry is operating on a full-time basis after previous delays. County roads are being improved.

Richard Spatz, highway construction contractor, purchased a portable rock crusher for his work on the Lusk to Lingle (Wyo.) project. The machine weighs 23 tons and was made by the Austin-Western Road Machinery Co.

Independence, Mo.: Jackson county is employing thirty men at its Quarry No. 1 at Adair Park quarrying and crushing rock. At Quarry No. 2, forty men are used to get out rock and for operating a tarvia plant.

West Plains, Mo.: The Howell county planning board has opened a limestone quary on the W. W. Toler farm, northwest of town, and is planning to furnish limestone to farmers at $1.25 a ton.

Polo, Mo.: A new power air compressor and jack hammer has been put into operation at the township rock crusher on the George Early farm, replacing hand drilling methods.

Sand and Gravel

St. Paul, Minn.: Ramsey county is producing 800 cu. yd. of clean, crushed gravel or sand daily with its new portable 24-35 Pioneer Duplex crushing plant. It contemplates leasing pits in all its projects.

Erie Sand and Gravel Co., Erie, Penn., has been awarded a contract to furnish all sand, gravel and filling materials to be used in the concrete construction for the Great Lakes Transportation Corp. freight house at Erie. About 18,000 tons of materials will be needed, and this is the largest contract of its kind awarded in recent years.

Cement

Lone Star Cement Co., Kansas, resumed operation at its Bonner Springs plant July 2 after having been shut down during June while repairs were made.

The state cement plant at Rapid City, S. D., broke all shipping records in its history by shipping 21 cars of cement on May 27. Sales Manager Hartley reports that business this year exceeds that of the same period in 1934 by 15%. Shipments from the plant in May totaled 265 cars.

Manufacturers

Bucyrus-Erie Co., South Milwaukee, Wis., held open house July 20, at which time several thousand people from Milwaukee, South Milwaukee and from out of town inspected the various departments of the plant, including the forge shop, machine shop, erecting floor, power house, plate shop, brass treating shop, steel foundry and pattern shop.

Farrel-Birmingham Co., Inc., Ansonia, Conn., held an annual sales conference the week of June 24.

Macwhyte Co., Kenosha, Wis., has moved its Chicago branch offices and warehouse from 507 Clinton St. to the newly remodeled Macwhyte Bldg., 228 S. Des Plaines St.

Johns-Manville, New York, N. Y., announces the addition to its J-M refractory cement line of a new "Light-Weight Firecrete," composed chiefly of high alumina clay calcined at high temperatures, and weighing only 75 lb. per cu. ft.

Bucyrus-Erie Co., South Milwaukee, Wis., has appointed **R. S. Armstrong & Bro. Co.**, 676 Marietta St., N. W., Atlanta, Ga., as its distributor in Georgia.

Timken Steel & Tube Co., Canton, Ohio, has appointed **Edgcomb Steel Co.**, D St. below Erie Ave., Philadelphia, Penn., as its agent in the Philadelphia district.

The Louis Allis Co., Milwaukee, Wis., has appointed **Harris-Green Co.**, 1101 Farmers Bank Bldg., Pittsburgh, Penn., as its engineering-sales representative in the western

United States Rubber Products, Inc., New York, N. Y., announces the appointment of Arch Miller as packing representative in mechanical goods sales for the Pittsburgh district.

Chain Belt Co., Milwaukee, Wis., has appointed R. X. Raymond manager of the Minneapolis district, to succeed G. A. Gunther. The latter now is in charge of the Detroit territory.

Bates Valve Bag Corp., New York, N. Y., announces installment of a group insurance plan. The insurance will be financed by contributions from both the company and the employes.

General Refractories Co., Philadelphia, Penn., has appointed **John C. Hopkins** district sales manager of its office in Cleveland, Ohio. **James P. Raugh** is associated in the same office.

American Diesel Engine Co., San Francisco, Calif., is moving in to its new manufacturing headquarters at 18th and Alabama Streets. Offices and salesrooms also are maintained there.

Babcock & Wilcox Co., New York, N. Y., announces that J. W. Barnett, recently director of the division of construction and finance of the U. S. Shipping Board, joined its marine department July 1.

Combustion Engineering Co., Inc., New York, N. Y., announces that **B. J. Cross** has rejoined its engineering department. **William Lloyd** also has rejoined the company's engineering department.

Bucyrus-Erie Co., South Milwaukee, Wis., has appointed **Joseph Kesl Tractor & Equipment Co.**, 1510 N. 13th St., St. Louis Mo., as its distributor in eastern Missouri and southern Illinois of machines ranging from ⅝- to 2-yd. capacity.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn., has appointed W. W. Spangler credit manager. L. A. S. Wood, chief lighting engineer, has been elected president of the Illuminating Engineering Society for next year.

Timken Steel & Tube Co., Canton, Ohio, announces the appointment of S. D. Williams as manager of tube sales with headquarters at Canton. Connected with the steel industry since 1913, Mr. Williams has been with the company since 1926.

Harnischfeger Corp., Milwaukee, Wis., has appointed Charles W. Daniels as general sales manager. Mr. Daniels, who has been with the company for many years, was most recently in charge of the Philadelphia office, where he is now replaced by L. M. Stout.

Joseph T. Ryerson & Son, Inc., Chicago, Ill., announces that its president, Edward L. Ryerson, Jr., has been elected to the board of directors of the New York Life Insurance Co. Announcement is also made of the election of E. W. Langdon, manager of the reinforcing bar division, as president of the Concrete Reinforcing Steel Institute.

Twenty-five executives of **McKinnon-Columbus Chain, Ltd.**, sailed recently for Veerenging, near Johannesburg, South Africa, where a new chain plant, to be known as McKinnon Chain-South Africa-Ltd., will be operated. The group is under the direction of F. E. Stahl, manager of the St. Catharines, Ont., plant and of the **Columbus-McKinnon Chain Corp.** and the **Chisholm-Moore Hoist Corp.** of Tonawanda, N. Y.

National Carbon Co., Inc., unit of **Union Carbide and Carbon Corp.**, New York, N. Y., won a suit against Richards & Co., Inc., and Zapon Co., of Stamford, Conn., for infringing on Chaney patents 1,497,543 and 1,497,544, covering activated vapor adsorbent carbon. The U. S. District Court ordered reparation of $24,410.65. The patents are based on the war-time discoveries of Dr. N. K. Chaney for use in gas masks.

Link-Belt Co., Chicago, Ill., announces the appointment of **Henry A. Petter Supply Co.**, Paducah, Ky., as distributors of crawler-mounted shovels-cranes-draglines and track-type locomotive cranes. Announcement is also made of the appointment of **Woodward & McMillan**, Apartado 1691, Edificio Metropolitana, Havana, as exclusive representatives for the sale of Link-Belt industrial elevating, conveying and power transmitting chains and machinery in Cuba. It has also appointed **Chadwick Machinery Co.**, Milwaukee, Wis., as distributors of Link-Belt machinery.

General Electric Co., Schenectady, N. Y., announces the retirement of John G. Barry, senior vice-president, after more than 45 years of service, and his election to an honorary vice-presidency. Vice-Presidents H. L. Andrews and E. W. Allen have become members of the apparatus sales committee, of which Vice-President E. O. Shreve has been appointed chairman. Industrial commercial engineering is under the direction of W. W. Miller, and central station commercial engineering is under M. O. Troy. The company's "New American" home-building program is reported to be making "exceptional progress."

Trade Literature

Synthetic Rubber. A folder contains a list of manufacturers using oil proof synthetic rubber cements. THIOKOL CORP., Yardville, N. J.

Pumps. The Hele-Shaw "Fluid Power" hydraulic pump is featured in a 44-page catalog. AMERICAN ENGINEERING CO., Philadelphia, Penn.

Engines. Type GA single and twin-cylinder horizontal Diesel engines are featured in a 12-page booklet. COOPER-BESSEMER CORP., Mt. Vernon, Ohio.

Feeders. Bulletin 33-C is a comprehensive publication on feeders, with detailed description of the constant weight feeder. HARDINGE CO., York, Penn.

Pumps. Acid and chemical pumps are described and diagramed in Bulletin 203, 2 pages. LAWRENCE MACHINE AND PUMP CORP., Lawrence, Mass.

Wire Rope. A new Aerial Tramway Handbook, cloth bound, 108 pages, is a complete text on aerial tramways. AMERICAN STEEL & WIRE CO., Chicago, Ill.

Tools. Catalog 35 gives descriptions, illustrations and prices on all kinds of wrenches, screwdrivers, pliers, etc. BONNEY FORGE & TOOL WORKS, Allentown, Penn.

Tires. "Twelve Rules for Tire Health" is a 4-page essay written by K. D. Smith, technical superintendent of the tire division, B. F. GOODRICH CO., Akron, Ohio.

Pumps. Bulletin D-17, 6 pages, announces Vortex "Black Arrow" single stage centrifugal pumps, in sizes from 2 to 14 in. LAWRENCE PUMP AND ENGINE CO., Lawrence, Mass.

Protective Hats. MSA Skullgards of various types, to prevent head injuries, are described in a 4-page folder. MINE SAFETY APPLIANCES CO., Pittsburgh, Penn.

Shaker. A new development in the mechanics of screening, grading and conveying, the Shaler Shaker, is described in 4-page folder. AJAX FLEXIBLE COUPLING CO., Westfield, N. Y.

Belt Dressing. "Houghton on Belt Preservatives" is the title of a new folder on how, when and why to use dressings on various kinds of belts. E. F. HOUGHTON & CO., Philadelphia, Penn.

Road Machinery. The general catalog of 31 pages for 1935 in colors shows photographs of all the company's products in action. AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Ill.

Welding. "Thermit Welding—Industry's Master Maintenance Tool" is the title of an illustrated 16-page booklet dealing with an alumino-thermic process. METAL & THERMIT CORP., New York, N. Y.

Roller Bearings. Engineering data and specifications for mine and quarry cars as regards cageless tapered roller bearings are available in loose-leaf binder. TYSON ROLLER BEARING CORP., Massillon, Ohio.

General. The twelfth booklet of a series on "The Fallacy of Wage and Hour Controls" by Allen W. Rucker in collaboration with N. W. Pickering has been released. FARREL-BIRMINGHAM CO., Ansonia, Conn.

Refractory Control. Bulletin 58 discusses, in an article by R. A. Heindl, thermal spalling of fire clay brick with relation to Young's modulus of elasticity, thermal expansion and strength. AMERICAN REFRACTORIES INSTITUTE, Pittsburgh, Penn.

Diesel Engines. Five new folders, covering application of Diesel power units to a wide variety of installations, feature action pictures with cost and operating information. CATERPILLAR TRACTOR CO., Peoria, Ill.

General. "The Power Specialist," published bi-monthly, features, in its March-April and May-June issues, a story on the microscopic vegetable organism known as the diatom. JOHNS-MANVILLE, New York, N. Y.

Conveyors. A Redler "continuous flow" conveyor that will convey in any direction—horizontally, vertically, up inclines and around bends—is described in a 4-page folder. STEPHENS-ADAMSON MFG. CO., Chicago, Ill.

Buckets. Catalog 353, 20 pages, presents rope reeve, power wheel, lever arm, and link-type buckets, specifying the materials and conditions for which they are best suited. INDUSTRIAL BROWNHOIST CORP., Bay City, Mich.

Rubber Footwear. "Lectro" boots molded in one piece like an auto tire are featured in two folders. Several kinds, for mining industries, are illustrated as well as work gloves and mittens. HOOD RUBBER CO., INC., Watertown, Mass.

Power Transmission Equipment. Catalog 56-T, 144 pages, supersedes catalog 43. It adds new items, such as flexible pin type couplings, tripart keyless couplings, and forged steel universal couplings. THE MEDART CO., St. Louis, Mo.

Core Drills. A 48-page colored booket shows the many uses of "Calyx" core drills with numerous pictures, with descriptions and illustrations of drill derricks, engines, pumps, cutters, bits and other equipment. INGERSOLL-RAND, New York, N. Y.

Electric Plants. A very small leaflet makes a rather complete announcement of 1935 streamlined models of Onan Electric Lighting Plants, which bring to remote places current similar to that enjoyed by cities. D. W. ONAN & SONS, Minneapolis, Minn.

Excavator. Operating and construction details of the P&H bantam-weight excavator are given in 16-page Bulletin 100-A. Condensed specifications and clearances are given in Supplementary Bulletin 100-C. HARNISCHFEGER CORP., Milwaukee, Wis.

Steel. The wear-and-tear on elevator buckets made, respectively, of sheet steel, malleable iron and Mallix iron, with a description of Mallix iron, is given in a single-page leaflet. NATIONAL MALLEABLE AND STEEL CASTINGS CO., Cleveland, Ohio.

Combustion Control. Data Book S-20, 32 pages, discusses basic problems of boiler operation and essentials of successful mechanical control, giving diagrams showing application to various types of fuel firing equipment. SMOOT ENGINEERING CORP., Chicago, Ill.

Scrapers. Super-carryall scrapers, in 12-, 8-, and 6-yd. capacities are featured in a new folder. Folders have also been released to describe the proficiency of a high-lift, low-drop bulldozer and the carrying facility of stoutly built buggies. R. G. LE TOURNEAU, INC., Peoria, Ill.

Welding. "The Metallurgy of Oxy-Acetylene Welding of Steel," by J. H. Critchett, vice-president of Union Carbide and Carbon Research Laboratories, Inc., discusses in easy language, physical and chemical principles involved in welding. LINDE AIR PRODUCTS CO., New York, N. Y.

Feed Water Regulators. Sixteen-page illustrated bulletin, No. 83, lists distinctive features, diagrammatically illustrates the principle of operation of the thermo-hydraulic generator, and describes regulating valves of tight seating and sleeve type construction. BAILEY METER CO., Cleveland, Ohio.

Electric Motors. A 24-page illustrated magazine is published bi-monthly for those interested in the purchase or maintenance of electric motors. It contains articles of general interest as well as engineering data and technical information on electric motors. LOUIS ALLIS CO., Milwaukee, Wis.

Pumps. New Worthington releases are: Bulletin W-200-B2A, surface condensers of patented folded tube layer arrangement, with welded steel shell construction; W-103-B1, horizontal duplex piston pumps for general services, type PC; L-800-B1, air lift pumping systems operated by air compressors; W-317-B4, vertical centrifugal pumps, type F; W-450-B22, No. 5 sump pump; W-1200-B12, No. 10 master breaker and sheeting driver for heavy demolition; L-620-B5A and B6A, air compressor units for oil and gas engine starting, Types VS and VA-2; W-316-B3, vertical "Freflo" sewage and drainage pumps for wet pit operation; W-450-B17A, deep well turbine pumps, types Q, QA, QB, QC. WORTHINGTON PUMP AND MACHINERY CORP., Harrison, N. J.

Classified Directory of Advertisers in this Issue of Rock Products

For alphabetical index, see page 2

This classified directory of advertisers in this issue is published as an aid to the reader. Every care is taken to make it accurate, but ROCK PRODUCTS assumes no responsibility for errors or omissions. The publishers will appreciate receiving notice of omissions or errors, or suggestions

Acetylene Welding Rod
American Steel & Wire Co.

Agitators, Thickeners and Slurry Mixers
F. L. Smidth & Co.

Air Compressors
Chicago Pneumatic Tool Co.
Curtis Pneumatic Machy. Co.
Fuller Co.
Gardner-Denver Co.
Nordberg Mfg. Co.
Traylor Eng. & Mfg. Co.

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Air Hoists
Curtis Pneumatic Machy Co.

Air Separators
Bradley Pulverizer Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Universal Road Machy Co.

Automatic Weighers
Richardson Scale Co.

Babbitt Metal
Joseph T. Ryerson & Son, Inc.

Backdiggers
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Backfillers
Harnischfeger Corp.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Bagging Machinery
Richardson Scale Co.

Balls (Grinding, See Grinding Balls)

Balls (Tube Mill, etc.)
Allis-Chalmers Mfg. Co.
Lorain Steel Co.
F. L. Smidth & Co.

Bar Benders and Cutters
Koehring Co.

Batchers
Fuller Company

Bearings
Link-Belt Co.
Joseph T. Ryerson & Son, Inc.
Timken Roller Bearing Co.

Bearings (Anti-Friction)
Timken Roller Bearing Co.

Bearings (Roller)
Timken Roller Bearing Co.

Bearings (Tapered Roller)
Timken Roller Bearing Co.

Bearings (Thrust)
Timken Roller Bearing Co.

Belting (Elevator and Conveyor)
B. F. Goodrich Co.
Robins Conveying Belt Co.

Belting (Transmission)
B. F. Goodrich Co.

Belting (V Type)
B. F. Goodrich Co.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Bin Gates
Fuller Co.
Industrial Brownhoist Corp.
Link-Belt Co.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Bins
M. A. Long Co.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Blasting Cap Protectors
B. F. Goodrich Co.

Blasting Machines
Atlas Powder Co.

Blasting Powder (See Powder, Blasting)

Blasting Supplies
Atlas Powder Co.

Blocks (Pillow, Roller Bearing)
Link-Belt Co.
Timken Roller Bearing Co.

Blocks (Sheave)
American Manganese Steel Co.

Boilers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Boots and Shoes
B. F. Goodrich Co.

Breakers (Primary)
Smith Engineering Works
Vulcan Iron Works
Williams Patent Crusher & Pulv. Co.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Harnischfeger Corp.
Hayward Company
Industrial Brownhoist Corp.
Link-Belt Co.

Buckets (Dragline and Slackline)
American Manganese Steel Co.

Buckets (Dredging and Excavating)
Harnischfeger Corp.

Buckets (Elevator and Conveyor)
Cross Engineering Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.

Bulldozers
Koehring Co.

Cableways
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Broderick & Bascom Rope Co.
Link-Belt Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Calciners
Vulcan Iron Works

Calcining Kettles (Gypsum)
J. B. Ehrsam & Sons Mfg. Co.

Cap Crimpers and Fuse Cutters
Ensign-Bickford Co.

Caps (Blasting)
Atlas Powder Co.

Car Pullers
Link-Belt Co.

Cars (Dump)
Lorain Steel Co.

Cars (Quarry and Gravel Pit)
Lorain Steel Co.

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Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.
Vulcan Iron Works

Cement Making Machinery
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Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Chain (Dredge and Steam Shovel)
Jeffrey Mfg. Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
Chain Belt Co.
Link-Belt Co.

Chain Drives
Chain Belt Co.

Chain Systems (Kilns)
F. L. Smidth & Co.

Chute Lining
B. F. Goodrich Co.

Chutes and Chute Liners
American Manganese Steel Co.
Cross Engineering Co.

Classifiers
Knickerbocker Company
Link-Belt Co.

Clay Working Machinery
Bonnot Company

Clips (Wire Rope)
American Steel & Wire Co.
Broderick & Bascom Rope Co.
Williamsport Wire Rope Co.

Coal Crushers and Rolls
Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Compressed Air Rock Drills
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Compressed Air Hoists
Gardner-Denver Co.

Compressors (See Air Compressors)

Concrete Slab Raising Equipment (Mud-Jack)
Koehring Co.

Contractors and Builders
M. A. Long Co.

Conveyor Idlers and Rolls
Link-Belt Co.

Conveyors and Elevators
Earle C. Bacon, Inc.
Fuller Company
Industrial Brownhoist Corp.
Jeffrey Mfg. Co. (Vibrating)
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Link-Belt Co.

Conveyors (Shaking Chute)
Vulcan Iron Works

Conveyoweighs
Richardson Scale Co.

Coolers (See Kilns and Coolers, Rotary)

Correcting Basins
F. L. Smidth & Co.

Couplings (Flexible and Shaft)
Link-Belt Co.

Couplings (Hose, Pipe, etc.)
B. F. Goodrich Co.

Cranes (Air Powered)
Curtis Pneumatic Machy. Co.

Cranes (Clamshell)
Harnischfeger Corp.
Koehring Co.

Cranes (Crawler and Locomotive)
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Lima Locomotive Works, Inc (Ohio Power Shovel Co.)
Link-Belt Co.

Cranes (Excavator
Koehring Co.

Cranes (Overhead Traveling Electric)
Harnischfeger Corp.
Industrial Brownhoist Corp.

Crusher Parts
American Manganese Steel Co.
Pennsylvania Crusher Co.

Crushers (Hammer)
Dixie Machy. Mfg. Co.
Lorain Steel Co.
Pennsylvania Crusher Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc. (Jaw))
Good Roads Machy. Corp. (Jaw)
Lewistown Fdy. & Mach. Co.
Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Smith Engineering Works
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Universal Road Machy. Co.

Crushers (Reduction)
Bonnot Company

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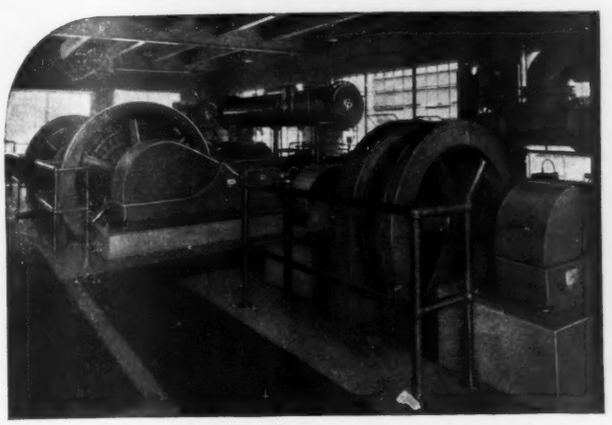
Single and two-stage designs; belt, direct-connected motor and steam drive; capacities up to 10,000 c.f.m.; special sizes also available.



"repeat" orders prove merit

Originally . . . two CP 2200 c.f.m., 400 hp. motor-driven Gas Compressors. Later . . . a "repeat" order for another of these, the third of the trio shown above. Recently . . . still another "repeat" for the same class and capacity machine. Four now, where three were before . . . and with eight additional CP Compressors in other plants of this prominent gas company, with whom compressor reliability is an absolute necessity . . . twelve in all!

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A SMALL PULVERIZER

FOR THE REDUCTION OF

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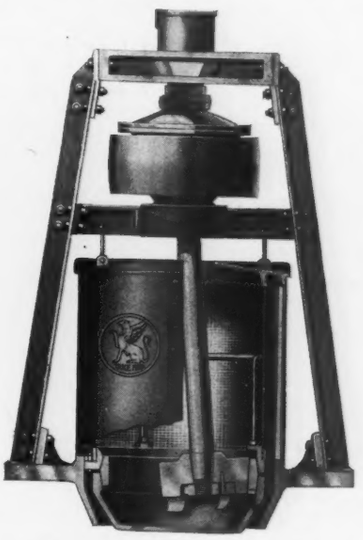
OR ANY DRY, NON-METALLIC STONE



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An inexpensive machine, distinguished for its low power consumption and low maintenance costs—for

FINE OR SEMI-FINE GRINDING
WITHOUT ANY AUXILIARY EUIPMENT.

POSITIVE CONTROL GUARANTEES UNIFORMITY OF PRODUCT.

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OTHER PULVERIZERS WITH CAPACITIES UP TO 50 TONS PER HOUR.

AIR SEPARATORS BUILT IN A WIDE RANGE OF SIZES TO MEET EVERY DEMAND.

LET OUR ENGINEERS HELP SOLVE YOUR PULVERIZING PROBLEMS

BRADLEY PULVERIZER CO.

BOSTON LONDON

Works: ALLENTOWN, PA.

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Crushers (Rotary)
J. B. Ehrsam & Sons Mfg. Co.

Crushers (Single Roll)
Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Jeffrey Mfg. Co.
Traylor Eng. & Mfg. Co.

Derricks and Derrick Fittings
Harnischfeger Corp.

Detonators
Atlas Powder Co.

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American Manganese Steel Co.

Dippers and Teeth (Steam Shovel)
American Manganese Steel Co.
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Koehring Co.

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Harnischfeger Corp.

Draglines
Harnischfeger Corp.
Link-Belt Co.

Draglines (Gasoline or Electric)
Koehring Co.

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Harnischfeger Corp.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Dragline Cableway Excavators
Link-Belt Co.
Sauerman Bros.

Dredge Pumps (See Pumps, Dredging)

Dredges
Hayward Co.
Morris Machine Works

Dredging Sleeves
B. F. Goodrich Co.

Drilling Accessories
Gardner-Denver Co.

Drills, Hammer (See Hammer Drills)

Drill Bits
Timken Roller Bearing Co.

Drills
Timken Roller Bearing Co.

Drills (Diamond Core)
Chicago Pneumatic Tool Co.

Drills (Rock)
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Drill Sharpening Machines
Gardner-Denver Co.

Drill Steel
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Combustion Engineering Corp.
Hardinge Company, Inc.
Traylor Eng. & Mfg. Co.
Vulcan Iron Works

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Koehring Co.

Dust Collecting Systems
Allis-Chalmers Mfg. Co.

Dust Conveying Systems
Fuller Company

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Atlas Powder Co.

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John A. Roebling's Sons Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.

Engineers
Bonnot Company
M. A. Long Co.
Productive Equipment Corp.
F. L. Smidth & Co.

Engines (Diesel)
Chicago Pneumatic Tool Co.
Nordberg Mfg. Co.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Co.

Excavators (Dragline)
Koehring Co.

Explosives
Atlas Powder Co.

Fans (Exhaust)
Jeffrey Mfg. Co.

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Fuller Co. (Cement and Pulverized Material)
Hardinge Company, Inc.
Jeffrey Mfg. Co. (Pan and Tube)
Smith Engineering Works (Plate)

Fittings (Dredge Pipe Line)
American Manganese Steel Co.

Forges (Oil)
Gardner-Denver Co.

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Gaskets
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Gasoline
Texas Company

Gears and Pinions
Link-Belt Co.
Vulcan Iron Works

Gears (Spur, Helical and Worm)
Jeffrey Mfg. Co.

Gelatin and Semi-Gelatin (See Explosives)

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Hayward Co.

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Gulf Refining Co.
Texas Company

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Babcock & Wilcox Co.
Lorain Steel Co.

Grizzlies
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Jeffrey Mfg. Co. (Vibrating)
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Grizzly Feeders
Jeffrey Mfg. Co.
Traylor Eng. & Mfg. Co.

Hammer Drills
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Hammer Mills (See Crushers)

Hoists
Chicago Pneumatic Tool Co.
Curtis Pneumatic Machy Co.
Gardner-Denver Co.
Harnischfeger Corp.
Link-Belt Co
Vulcan Iron Works.

Hose (Water, Steam, Air Drill, Pneumatic, Sand Suction and Discharge)
Chicago Pneumatic Tool Co.
B. F. Goodrich Co.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.

Hydrators
Vulcan Iron Works

I-Beam Trolleys
Curtis Pneumatic Machy. Co.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Bonnot Company
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Vulcan Iron Works

Kilns (Shaft)
Vulcan Iron Works

Kominuters (See Mills)

Lighters, Hot Wire (For Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Company
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Lime Kilns (See Kilns and Coolers, Rotary)

Linings (Iron for Ball and Tube Mills). See Mill Liners)

Linings (Rubber for Ball and Tube Mills)
B. F. Goodrich Co.

Loaders and Unloaders
Fuller Company
Jeffrey Mfg. Co.
Link-Belt Co.
Universal Road Machy. Co.

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Diesel)
Vulcan Iron Works

Locomotives (Diesel-Electric)
Vulcan Iron Works

Locomotives (Gas Electric)
Vulcan Iron Works

Locomotives (Geared)
Lima Locomotive Works, Inc.
Vulcan Iron Works

Locomotives (Steam, Gas and Electric)
Lima Locomotive Works, Inc.
Jeffrey Mfg. Co.
Vulcan Iron Works

Locomotives (Storage Battery)
Jeffrey Mfg. Co.
Vulcan Iron Works

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
American Steel & Wire Co. (Wire Rope)
Broderick & Bascom Rope Co. (Wire Rope)
Gulf Refining Co.
Texas Company

Machinery Guards
Harrington & King Perforating Co.

Manganese Steel Castings
American Manganese Steel Co.
The Frog, Switch & Mfg. Co.

Manganese Steel Parts
American Manganese Steel Co.

Mechanical Rubber Goods
B. F. Goodrich Co.

Mill Liners and Linings (Iron for Ball and Tube Mills)
Babcock & Wilcox Co.
Jeffrey Mfg. Co.
Lorain Steel Co.
F. L. Smidth & Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
Bonnot Company
Bradley Pulverizer Co.
Knickerbocker Company
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Vulcan Iron Works
Williams Patent Crusher & Pulv. Co.

Mixers (Concrete)
Koehring Co.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
Harnischfeger Corp.

Multiple V-Belts
B. F. Goodrich Co.

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Babcock & Wilcox Co.
F. L. Smidth & Co.

Oils (Lubricating)
Gulf Refining Co.
Texas Company

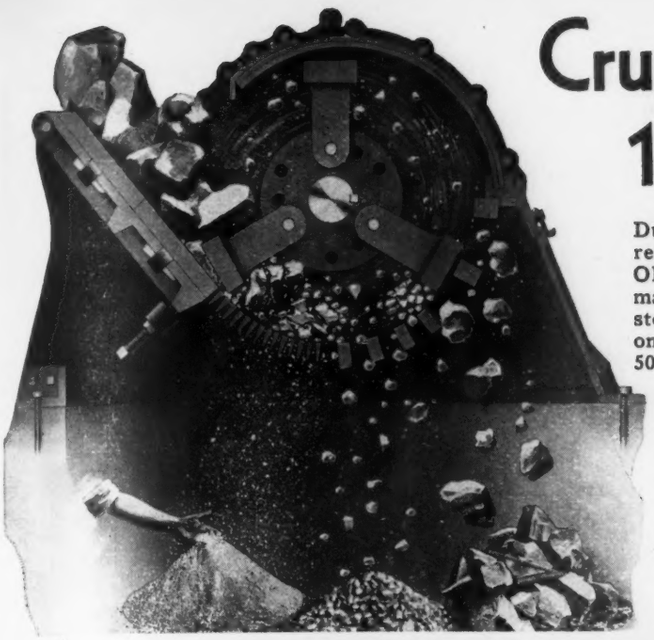
Oilers (Air Line)
Gardner Denver Co.

Oil Forges
Gardner-Denver Co.

Overhead Traveling Cranes
Curtis Pneumatic Machy. Co.

Packings (Pump, Valve, etc.)
B. F. Goodrich Co.

Paint (Asphalt)
Texas Company



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PATENT CRUSHERS · GRINDERS SHREDDERS

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INDUSTRIAL BROWNHOIST

NEW YORK, PHILADELPHIA
CLEVELAND, CHICAGO

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

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Pavers (Concrete)
Koehring Co.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Morrow Mfg. Co.

Plates (Double Corrugated)
Hendrick Mfg. Co.

Pneumatic Drills (See Drills)

Portable Conveyors
Fuller Company
Link-Belt Co.

Portable Crushing and Screening Unit
Good Roads Machy. Corp.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Powder (Blasting)
Atlas Powder Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Dixie Machy. Mfg. Co.
Jeffrey Mfg. Co.
Knickerbocker Company
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Universal Road Machy. Co.
Williams Patent Crusher & Pulv. Co.

Pulverizer Parts
American Manganese Steel Co.

Pumps (Air Lift)
Fuller Company

Pumps (Cement)
Fuller Company

Pumps (Cement Slurry)
American Manganese Steel Co.
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allis-Chalmers Mfg. Co.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Dredging)
American Manganese Steel Co.
Morris Machine Works

Pumps (Pulverized Coal)
Babcock & Wilcox Co.

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Morris Machine Works
A. R. Wilfley & Sons

Road Machinery
Harnischfeger Corp.
Koehring Co.

Rock Bits (See Drill Bits)

Rock Drills (See Drills, Rock)

Rod Mills
Traylor Eng. & Mfg. Co.

Roller Bearings
Timken Roller Bearing Co.

Roofing (Ready to Lay)
Texas Company

Roofing and Siding (Steel)
Joseph T. Ryerson & Son, Inc.

Rope, Wire (See Wire Rope)

Rubber Covered Screens
B. F. Goodrich Co.

Sand Drag
Smith Engineering Works

Sand and Gravel Screening and Washing Equipment
Universal Road Machy. Co.

Sand Settling Tanks
Link-Belt Co.
Smith Engineering Works

Scales (Automatic Proportioning)
Richardson Scale Co.

Scales (Cement)
Richardson Scale Co.

Scraping Hoists
Gardner-Denver Co.

Scrapers (Power Drag)
Harnischfeger Corp.
Link-Belt Co.
Sauerman Bros.

Screens
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.
Lorain Steel Co.
Morrow Mfg. Co.
National Wire Cloth Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
John A. Roebling's Sons Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.
Universal Vibrating Screen Co.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works

Screens (Vibrating)
Austin-Western Road Machy. Co.
Link-Belt Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
Smith Engineering Works
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

Screw Rewasher (Single and Twin)
Smith Engineering Works

Scrubbers
Hardinge Company, Inc.
Knickerbocker Company
Lewistown Fdy. & Mach. Co.
Smith Engineering Works

Seal Rings
Traylor Eng. & Mfg. Co.

Separators (Slurry)
F. L. Smidth & Co.

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)
Link-Belt Company

Silos
M. A. Long Co.
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.

Slings (Wire Rope)
American Cable Co., Inc.
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Sockets (Wire Rope)
American Steel & Wire Co.

Soft Stone Eliminator
Knickerbocker Company

Speed Reducers
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Sprockets and Chain
Jeffrey Mfg. Co.

Steam Shovel Repair Parts
American Manganese Steel Co.

Steel (Abrasion Resisting)
Joseph T. Ryerson & Son, Inc.

Steel Bars
Timken Roller Bearing Co.

Steel (Bars, Shapes, Plates, etc.)
Joseph T. Ryerson & Son, Inc.

Steel (Electric Furnace)
Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Timken Roller Bearing Co.

Steel (Special Analysis)
Timken Roller Bearing Co.

Stokers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Tanks
Combustion Engineering Corp.
Link-Belt Co.

Tires and Tubes
B. F. Goodrich Co.

Track Equipment
Lorain Steel Co.
Nordberg Mfg. Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
Koehring Co.

Tramways (Aerial Wire Rope)
American Steel & Wire Co.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Blasting)
B. F. Goodrich Co.

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Underground Shovels
Nordberg Mfg. Co.

Valves (Air)
Curtis Pneumatic Machy. Co.

Valves (Pump)
B. F. Goodrich Co.

Vibrating Screens (See Screens, Vibrating)

Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Eagle Iron Works
Hardinge Company, Inc.
Knickerbocker Company
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Waste Heat Boilers
Combustion Engineering Corp.

Weigh-Mix
Koehring Co.

Weighing Equipment
Richardson Scale Co.

Welding and Cutting Apparatus
Harnischfeger Corp.

Welding Rod
American Steel & Wire Co.
Joseph T. Ryerson & Son, Inc.

Welding Wire
American Steel & Wire Co.
John A. Roebling's Sons Co.

Wire (Rubber Insulated)
American Steel & Wire Co.

Wire Cloth
Cleveland Wire Cloth & Mfg. Co.
National Wire Cloth Co.
John A. Roebling's Sons Co.

Wire Rope
American Cable Co., Inc.
American Steel & Wire Co.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Fittings
American Cable Co., Inc.
American Steel & Wire Co.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Slings (See Slings, Wire Rope)

Wire Rope Sockets (See Sockets, Wire Rope)

SHAY GEARED LOCOMOTIVES

---Built for Quarry Service!

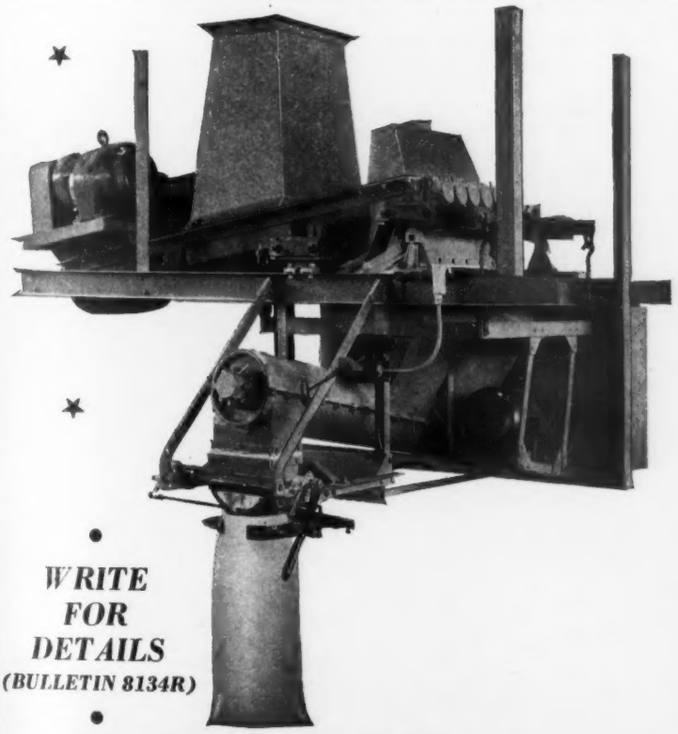
THERE'S no question about the adaptability of Shay Geared Locomotives to quarry service. They are built for it.

Shay Geared Locomotives are rugged. This fits them to withstand abuse and to give continuous, dependable operation under the most severe conditions.

Shay Geared Locomotives have great power. Their three-cylinder engines start heavy loads quickly and pull them up hard-to-climb grades without difficulty or delay. Speedier car movement keeps quarry production at a maximum.

Because of these advantages . . . and others we will gladly tell you about . . . the Shay is the most reliable locomotive investment you can make. Write for catalog.

LIMA LOCOMOTIVE WORKS, Incorporated
LIMA, OHIO
Sales Office: 60 E. 42nd St., New York, N. Y.



WRITE FOR DETAILS (BULLETIN 8134R)

RICHARDSON

NEW "*Multiple Screw Feed*" Automatic Scale

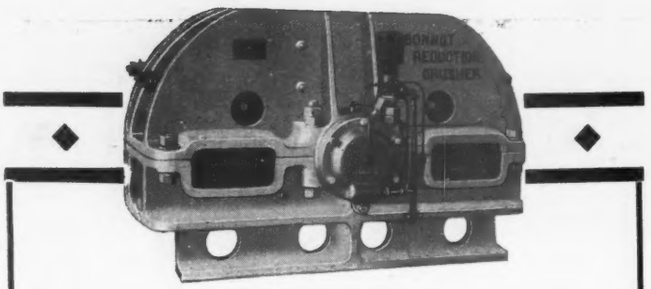
Here is another time-saving, profit-building innovation in automatic scales for any pulverized materials—bagging or bulk. It is speedy—saves labor and material—entirely dustproof—self-feeds and weighs automatically. It is especially adapted for dry, sluggish or lively ground materials that ordinary machines won't handle.

It is enclosed and dustless—machine deaerates the material as it feeds, and feeds and weighs without dust. It is accurate, despite any variation in the feed supply. Requires small head room. Available for bulk weighing or open mouth bagging or both. It is durable. Upkeep cost is low. It is the scale that increases your profits.

It is ideal for weighing direct from bins. There are five feeder screws, three of which are faster than the other two. The three furnish the "full flow" and deliver the major part of the weighing and stop. The other two supply the "dribble" or reduced flow necessary to complete the loads.

RICHARDSON SCALE COMPANY
Clifton, New Jersey

New York Minneapolis Chicago Omaha Los Angeles Boston
Syracuse Atlanta Philadelphia Wichita Cleveland
Agents for Eastern Canada: Messrs. Peacock Brothers, Ltd., Montreal

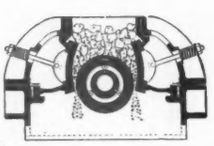


BONNOT

REDUCTION CRUSHERS ALWAYS PAY BETTER

The operators themselves tell us so. The Bonnot Crusher meets the most exacting present-day demands for crushed aggregates requiring absolute accuracy of sizing plus high strength and bonding value — aggregate that will be cubical in shape and minus flaws and incipient cracks.

NOTE THIS CONSTRUCTION



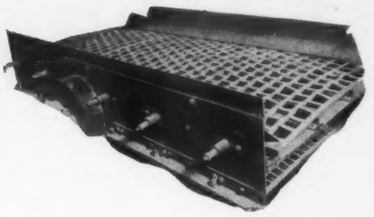
Manganese Wearing Parts
Reversible Concaves
Cast Steel Frame
Bronze Sleeve Bearings
Renewable Liners
Extra Large Shaft
Positive Pressure Lubrication
Cast Iron Safety Plates

The BONNOT Line Includes: Crushers—Hammer Mills—Pulverizers—Cement Mill Machinery—Rotary Kilns—Disc Feeders, etc.

Write for Bulletin No. 150

THE BONNOT CO.
CANTON, OHIO
— SINCE 1891 —
New York Office: 30 Church St.

These Double Corrugations



DO MORE

IF you're seeking extra production without increase in equipment, apply to your screens the greater tumbling action of Hendrick Double Corrugated Heat-Treated High-Carbon Plate.

Not only will you find the finished product cleaner, but you'll also be pleased with the long service life of this superior screening medium. Write for additional information.

HENDRICK MANUFACTURING CO.
47 Dundaff St., Carbondale, Pa.

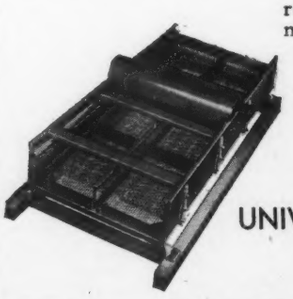
Baltimore Birmingham Boston
Cincinnati Cleveland Detroit Hazleton
New York Philadelphia Pittsburgh

Makers of Elevator Buckets of all types, Mitco Open Steel Flooring, Mitco Shur-Site Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction.

if *DIOGENES had Been a Producer?*

Naturally he would have been in search of honestly-made equipment. When it came to choosing a vibrating screen his most exacting demands for honesty would have been met by a vibrator of the Late Model UNIVERSAL Type.

This Super-Vibrator is substantially built of quality material throughout. It is designed for maximum efficiency, capacity and economy and sold at an honest price—a price that means a saving right from the start. Production records, testimonial letters and a high percentage of reorders verify all claims made for the UNIVERSAL Super-Vibrator. Its outstanding simplicity assures years of trouble-proof service and lowest upkeep cost.



IF INTERESTED WRITE

UNIVERSAL VIBRATING SCREEN CO.
RACINE, WIS.

It is part of Rock Products' conception of its duty to readers and subscribers to help them in every possible and legitimate way. The "Situations Vacant" and "Situations Wanted" advertisements are a part of this service. The charges of 2 cents a word, or a minimum charge of a dollar per insertion, are nominal and not designed for profit. Numerous letters from these advertisers assure us of the effectiveness of these advertisements in finding capable men for openings and of finding openings for capable men.

CLASSIFIED ADVERTISEMENTS

POSITIONS WANTED — POSITIONS VACANT—two cents a word. Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION
Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED — Displayed or undisplayed. Rate per column inch, $4.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

Used Equipment for Sale

LOCOMOTIVES
STANDARD GAUGE

30-ton American 4-wheel saddle tank.
33-ton Vulcan 4-wheel saddle tank.
36-ton Porter 4-wheel saddle tank.
40-ton Baldwin 4-wheel saddle tank.
40-ton Davenport 4-wheel saddle tank.
40-ton American 4-wheel saddle tank.
50-ton American 4-wheel saddle tank.

All equipped with Code Boilers, thoroughly rebuilt and ready for immediate shipment.

BIRMINGHAM RAIL & LOCOMOTIVE COMPANY
BIRMINGHAM, ALABAMA

1—70′ McMyler Stiff Leg Derrick.	$1500.00
3—Cyclone Drills. Each.....	500.00
1—Armstrong Drill.....	500.00
1—Porter Steam Locomotive.....	1000.00
1—G. E. 25 K.W. D.C. Generator.	400.00
1—12″ A.M.S. Sand & Gravel Dump	3000.00
30—3¾x4 yd. 36″ gauge Dump Cars. Each	25.00
10—Blaw-Knox No. 2 Weighing Batchers. Each	100.00

Missouri Portland Cement Company
St. Louis, Missouri

Jaw Crushers—2″x4″ up to 66″x84″.
Crushing Rolls—12″x12″ up to 54″x64″—Gyratory Crushers.
Ring Roll Mills — No. 0 and No. 1 — Swing Hammer Mills.
Rotary Fine Crushers—No. 1, No. 1½, No. 2.
Direct Heat Rotary Dryers—4′x30′, 5′x30′, 5½′x40′, 6′x50′, and 3½′x25′.
Semi-indirect Heat Dryers, 4′x30′, 4½′x26′, 5′x30′ and 8½′x75′.
Cement Kilns—3′ up to 8′ diameter.
Hardinge—Marcy & Fuller—Lehigh Mills.
Raymond Mills—No. 00, No. 0 and No. 1.
Tube—Rod and Ball Mills—4′ to 8′ diameter.
Air Separators—3′ and 10′ Gayco - Screens.
Complete drying and asphalt mixing plants.

W. P. HEINEKEN
95 Liberty St., N. Y. Tel.: Barclay 7-7298.

Used Sauerman Drag Line Equipment
Including—
1—110′—O Mast.
1—Electric two-speed Hoist without motor.
1—New 1⅜″ dia. Track Cable, 924′-0 long.
1—New 1⅜″ dia. Guy Cable, 320′-0 long.
1—New 1¼″ dia. Guy Cable, 480′-0 long.
1—Trolley.
2—1½-yard Buckets.
Lot of used cable, guy lines, pull-in line, winch blocks, etc.
2—Sets Triple Sheave Blocks.
3—Winches for track cable.
Spare Parts.

Pittsburgh Plate Glass Company
Barberton, Ohio

---

100 H.P. Worthington Diesel Elec. Unit.
750-yd. and 1,250-yd. Asphalt Plants.
K44 Link Belt Cat. Dragline and Shovel.
2—50B Bucyrus Diesel Draglines.
½-yd. cap. Byers Shovel and Crane.
Model 4 Northwest Gas Shovel and Crane.
Champion 1030 Roller-Bearing Jaw Crusher.
18x36 Farrel B Jaw Crusher.
48x36 Allis-Chalmers Jaw Crusher.
Pennsylvania SX4 Hammermill.
Clyde Lime Hydrator.
Raymond Size O Lime Pulverizer.
Keystone Gasoline-Operated Well Drill.
Sanderson 14 Electric Well Drill.
Ingersoll-Rand 34 and 50 Drill Sharpeners.
50-ft. by 20-in. Portable Belt Conveyor.
550-ft. Worthington Duplex Compressor.
6-ton Universal Truck Crane.
110-ft. Ingersoll-Rand 20 Portable Compressor.

R. C. STANHOPE, INC.
875 Sixth Ave. New York, N. Y.

FOR SALE
12—5-yd. 36″ ga. Western Dump Cars.
6—2-yd. 36″ ga. Koppel Steel V Dump Cars.
4—1½-yd. 36″ ga. Insley Steel V Dump Cars.
2—3½-ton 36″ ga. Whitcomb Gasoline Locomotives.
1—9x10 Sturtevant Vertical Steam Engine.
1—10x10x12 Ingersoll Steam-Driven Air Compressor.
1—9x10 Lidgerwood 3-Drum Steam Hoist.
1—8¼x8 Lidgerwood S.D. Steam Hoist.
22—12-yd. Western std. ga. Air or Hand Dump Cars.
2—40-ton Baldwin S.T. Locomotives, 14x 22 cyls.
Rails—First-Class Relay Rails and Bars, 60, 70, 80, 85, 90 and 100 lb. Rails, Tie Plates, etc.

HYMAN-MICHAELS CO.
20 N. Wacker Dr. Bldg., Chicago
Railway Exchange Bldg. St. Louis, Mo.
101 West 31st St. New York

4—1-yd. Rex motor truck mixers with LeRoi gas engines, (only handled 5,000 yds.), attractively priced.
3—7-ton Plymouth, Milwaukee and Whitcomb 24″ gauge gasoline locomotives, A-1 condition.
2—8-ton Plymouth 36″ gauge gasoline locomotives, A-1 condition.
2—14-ton Plymouth standard gauge M.C.B. couplers, air brakes, only used 7 months, A-1 condition.
2—750 cu. ft. Sullivan Class WN-31 angle compound compressors, 125 H.P. synchronous motors, 3-60-220 volt, like new.

MERTES MACHINERY COMPANY
1622 S. 1st Street Milwaukee, Wis.

FOR SALE — CHEAP
2-yd. Monighan Dragline, 80-ft. boom. New Deisel Engine—late style Walkers. Can be demonstrated.

Gordon Sand & Gravel Co.
1900 31st Street Denver, Colo.

Marion Gas Electric ¾-Yard Shovel.
1-Yd. Osgood Crawler Shovel, rebuilt.
Side and Center dump cars.
Locomotives—75-ton Switcher, code boiler —saddle tank type, 18 to 65 tons.
Cranes and Draglines, various sizes.

SOUTHERN IRON & EQUIPMENT CO.
Atlanta, Georgia

FOR SALE
60″ x 24′ Austin Revolving Stone Screen, Main Barrel 1⅜″, 1¾″, 2½″, 3″ and 4″ round holes, punched in ½″ plate. 2 jackets ⅞″ and ¼″ holes. Bought new in 1931, excellent condition and priced to sell.

Hopkinsville Stone Company
P. O. Box 41, Hopkinsville, Ky.

LOOK THESE OVER!!!
30 Rock drills, Ingersoll Rand X59.
10 Drifters, Ingersoll Rand S70. New.
25 DCR-23 Ingersoll Rand rock drills.
1 Lot of columns, arms and clamps, Ingersoll Rand.
1 Air Compressor, I-R, 1300′, direct motor drive.
1 Air Compressor, I-R, 1200′, short belt.
3 310′ gas, portable, I-R, air compressors.
2 Caterpillar tractors, No. 60, gas, with bulldozers.
1 Shovel-crane combination Lorraine, 1¼ yd. cap.
2 Derricks, all steel stiff legs, 100′ booms, 15 tons.
2 Locomotives, Plymouth, gas, 14 tons, 36″ gauge.
2 Locomotives, Plymouth, gas, 8 tons, 36″ gauge.
1 Locomotive, Vulcan, gas, 4½ tons, 36″ ga.
40 Dump cars, two way side, 5 yds. 36″ ga.
25 Clamshell, tip over and skip buckets.

RICHARD P. WALSH CO.
30 CHURCH ST. NEW YORK, N. Y.

MUST MOVE
NEW Steel for modern Bldg., 445′x730′.
Rotary Kilns, 8x110 and 8x125.
2 Smooth Tube Mills, 5′x22′.
2 No. 80 Bailey Feeders.
1 A-C Gates 4K Gyr. Crusher, 8x30.
2 Penn S-7 Hammer Crushers, 36x16.
1 A-C McCully Crusher, 10x52.
1 Goodman No. 48 u/g electric Shovel.
1 25-T Loco. Crane, 50′ & 75′ booms.
1 30-T Loco Crane, 60′ boom.
1 5-yd. Williams Clam Bucket.
2 80 c.f. 5-ton Hulett Buckets.
1 40 H.P. Vertical Boiler.
2 75 H.P. Vertical Boilers.
2 0-6-0 50-ton Baldwin Locos.
20 & 30 yd. Dump Cars.
50-ton Gondola & Hopper Cars.
All Types of Crushers and Equipment.

IRON & STEEL PRODUCTS, INC.
Railway Exchange, Chicago

DIESEL AND GASOLINE ENGINES
NEW and REBUILT
JOHN REINER & CO., INC.
29 Howard St. NEW YORK CITY
Telephone Canal 6-0286

DRAG SCRAPER AND SLACKLINE EQUIPMENT FOR SALE
8—DRAG SCRAPER outfits, sizes ½ to 2½ yds.
5—SLACKLINE outfits, sizes ½ to 2 yds.
50—Wire Rope blocks. Most all sizes. Some GOOD used wire rope.
"Everything in Draglines and Slacklines"
S. O. Nafziger, 53 W. Jackson Blvd., Chicago

Haiss Path Digging Bucket Loader, on wheels
Sauerman 1-yd. Crescent Power Scraper
Portable Track, Cars, Switches, Turntables
Link-Belt 40′ Chain Elevator, 12″ buckets
Belt Conveyor Equipment, 16″ to 36″ wide
Mechanical Tripper for 18″ to 20″ Belt
Jeffrey No. 3 Jaw Swinghammer Pulverizer
Buckets, Hoists, Pumps, Gasoline Engines
Robins Perfex Vibrating S. D. Screen, 4′x7′
Clyde Lime Hydrator No. 3

G. A. Unverzagt, 15 Park Row, New York City

GEORGE HAISS MFG. CO., Inc. — Haiss — **Park Ave. & 141rd St. New York**

Send me full details and prices on equipment checked:

FACTORY REBUILT CLAM SHELL BUCKETS
☐ 1—Haiss Rehandling 1½-yd. bucket
☐ 1—Blaw-Knox ¾-yd. Dreadnaught Bucket
☐ 1—Owen 2½-yd. Type "S" Bucket
☐ 1—Haiss 1-yd. HiPower Digging Bucket
☐ 1—Haiss 1-yd. Contractor Type Bucket
☐ 1—Hayward 1½-yd. Type "E" Bucket
☐ 1—Haiss ½-yd. HiPower Digging Bucket
☐ 1—Hayward 1¼-yd. Type "E" Bucket

Factory Rebuilt Truck Loader & Belt Conveyor
☐ 1—Haiss 2-yd. a min. Creeper Truck Loader
☐ 1—Haiss 1¼-yd. a min. Creeper Truck Loader
☐ 1—Haiss 25 ft. 16 in. Trough Conveyor, LeRoi, Gas.

Name .....
Address .....

(Classified Advertising Continued on Next Page)

Continued from Preceding Page

USED EQUIPMENT

GOOD USED EQUIPMENT

SELECTED SPECIAL ITEMS

1—No. 1260 Jeffrey Bakstad Jaw Crusher.
2—36″x54″, 48″x72″ Buchanan Jaw Crushers, all steel, Type C.
2—20″ Superior McCully Gyratory Crushers, short head type.
1—42″ Merrick Conveyor Weightometer.
1—8′8″x85′ Ruggles-Coles Class A Rotary Dryer; also 2—5′x26′.
1—5-roll Raymond high-side Mill.
2—3-roll Raymond high-side Mills.
3—5′x50′ Allis-Chalmers Rotary Dryers.
1—8′x125′ Rotary Kiln.
5—6′6″x60′ Vulcan Rotary Kilns.
1—3′x25′ Bonnot Rotary Dryer-Kiln.
1—8′x12′ Oliver Rotary Filter.
1—12′ Gayco Air Classifier.
5—5′x22′ Gates iron-lined Tube Mills.
1—7″x24″ Sturtevant Jaw Crusher, to ½″.
1—36″x36″ Gruendler Hammer Mill, roller bearing, No. 4XC.
1—36″x24″ Jeffrey Type D Hammer Mill.
1—7′ Symons Cone Crusher.
2—20x14, 36x16 Sturtevant Crushing Rolls.
1—30x10 Colo. Iron Wks., Crushing Roll.
1—24″x72″ Magnetic Pulley, complete.
6—Hardinge Ball Mills, 4½x16, 6x22, 6x36, 7x36, 8x22, 8x30.
1—3′x12′ Hendy iron-lined Tube Mill.
2—6′x35′ Louisville hot-air Rotary Dryers.
2—6′x45′ Rotary Dryers—MONEL LINED.
8—3x5, 4x5, 4x7 Tyler Screens.
1—4′x8′ Rotex, single deck.
1—305′ 20″ Conveyor, motor, reducer.
1—48″ C/C enclosed Bucket Elevator, 14″ buckets, 3/32″ rubber covered 8-ply belt, with motor and reducer.
2—Shepard-Niles Traveling Cranes, 20-ton, 30′ span—10-ton, 24′ span, hand, chain operated.
1—16′ Allis-Chalmers Log Washer.
1—25′ Allis-Chalmers Log Washer.
8—6″ Georgia Iron Works Dredge Pumps.

SEND FOR BULLETIN OF

our regular stock of Crushers; Vibrating Screens; Ball, Rod and Tube Mills; Air Compressors; Rotary Kilns and Dryers; Hardinge Ball and Pebble Mills; Raymond and other Pulverizers; Air Classifiers; Thickeners; Wet Classifiers; Filter Presses, Continuous Filters, etc.

CONSOLIDATED PRODUCTS COMPANY, INC.

15 - 16 - 17 Park Row, New York City

Shops and Yards at Newark, N. J. cover eight acres.

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C., for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

V. M. NUSSBAUM & CO.,
Fort Wayne, Indiana

POWER UNITS—15 to 200 H. P.
GENERATOR SETS—5 to 100 KW.

NEW **ENGINES** REBUILT

NEAFIE & STAHL, INC.
125 Cedar St., N. Y. C.

MODERN
AIR COMPRESSORS
All Types and Sizes
Rebuilt—Guaranteed
EARL E. KNOX COMPANY
20 West 2nd St. Erie, Pa.

USED EQUIPMENT

2-yd. Marion 480 Shovel-Crane.
1¼-yd. Byers Shovel-Crane.
1¼-yd. Lorain 75 Shovel.
1-yd. Koehring Crane.
¾-yd. P&H Shovel-Crane.
½-yd. Byers Shovel-Crane.
30—1-yd. Heavy Steel Stone Skips.
Compressors 110′, 250′, 310′, 750′, 265′, 1000′, 1200′.
Draglines and Slacklines, ½, 2, 3 yd.
Crushers, Telsmith 13A, 40.
Crushers, Jaw 10x18, 24x36.
Electric Hoists, 10, 30, 60, 80 HP.
Derricks, 10, 15, 20 ton.
Clamshells, ½, ¾, 1, 1¼ yd.
Pumps 3,000, 5,000 gal.

J. T. WALSH
500 Brisbane Bldg. Buffalo, N. Y.

Two Thew Gasoline Shovels

One Lorain 75, 1¼-yd. dipper.
One Lorain 60, 1-yd. dipper.
Prices reasonable, in excellent condition, available immediately. Also other cranes and shovels.

Thomas Doyle
6043 Washington Ave. Phila., Pa.

New—RAILS—Relaying
ALL SECTIONS

Also contractors equipment, "V" shaped and Western cars, 24 and 36-in. gauge, portable track, gas locos, frogs and switches. Attractive prices quoted, wire for quotations.

M. K. FRANK
480 Lexington Ave. New York, N. Y.
Pittsburgh Pennsylvania

CARS

12-Yd. Western Air, also Hand Dump Cars, Flats, Gondolas, Steel Hopper Cars, Box Cars, Locomotives.

HYMAN-MICHAELS COMPANY
20 N. Wacker Dr. Bldg., Chicago, Ill.
Railway Exch. Bldg. St. Louis, Mo.
101 West 31st St. New York

SPECIALS FOR THIS MONTH

300 H.P. GE slipring motor 25/3/2200/375
150 H.P. Allis-Chalmers slipring motor 25/3/2200/500
125 H.P. Allis-Chalmers slipring motor 25/3/440/1500
300 H.P. GE slipring motor 25/3/440/500
75 H.P. GE slipring motor 25/3/440/750
50 H.P. Wagner slipring motor 25/3/440/750
Complete stock 60-cycle motors and transformers.

ERIE ELECTRIC MOTOR REPAIR CO., Inc.
120 Church St. Buffalo, N. Y.

FOR SALE

No. 5D Allis-Chalmers Gyratory Crusher. Shop No. 5161, smooth head chilled iron, excellent condition.
20—2-yd. end dump steel quarry cars, 36″ gauge, about 6,000 ft. 30-lb. rail, 15 switches and steel mine ties.
Priced to sell or will trade for good used ¾ or 1 yd. shovel, gasoline, Diesel or electric power.

Cerulean Stone Company
Cerulean, Kentucky

Take advantage of the Opportunity offered in the Used Equipment Department to dispose of the equipment that you no longer need.

USED EQUIPMENT WANTED

WANTED

1—20-inch Belt Conveyor complete with feeder pan.

FOR SALE OR TRADE

2—6-inch Ga. Iron Works Sand & Gravel Pump.
500 feet 6 in. pipe and connections.
25 H.P. 440 Volt Electric Motor.

Southeastern Sand & Gravel Co., Inc.
Union Springs, Ala.

WANTED

1—½-yd. gas crane or shovel.
1—3x6 three-deck vibrator screen.
1—3x6 shaker screen.

Quality Sand & Gravel Co., Wapakaneta, Ohio

WANTED—Approx. 400 ft. Rubber-Coated Conveyor Belting, 12 inches to 16 inches wide. Address Box 684, care of Rock Products, 330 South Wells Street, Chicago, Ill.

THESE columns offer you the best medium in the rock products industry for the sale, exchange and purchase of used equipment, rock, quarry and gravel-pit property; the circulation and buying influence of Rock Products extends beyond those now actually engaged in operating plants; it includes mining engineers and capitalists who may be reached through no other medium, because of Rock Products' world-wide reputation as the **business journal** of the rock products industry.

BUSINESS OPPORTUNITIES

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